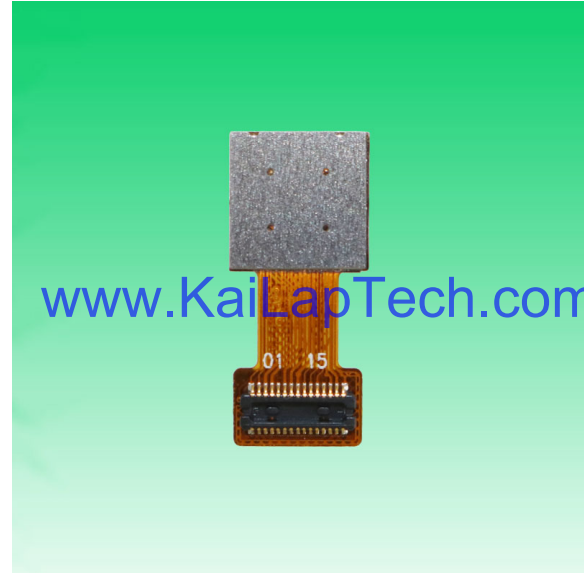## KLT-M3MA-AR1335 PLCC V3.0
13MP OnSemi AR1335 PLCC MIPI Interface
Auto Focus Camera Module

Front View

Back View

**Specifications**

Camera Module No.	KLT-M3MA-AR1335 PLCC V3.0
Resolution	13MP
Image Sensor	AR1335 PLCC
Sensor Type	1/3.2"
Pixel Size	1.1 um x 1.1 um
EFL	2.35 mm
F.NO	2.40
Pixel	4208 x 3120
View Angle	127.0°(DFOV), 99.5°(HFOV), 70.0°(VFOV)
Lens Dimensions	8.50 x 8.50 x 6.45 mm
Module Size	19.57 x 8.50 mm
Module Type	Auto Focus
Interface	MIPI
Auto Focus VCM Driver IC	FP5510
Lens Model	KLT-LENS-TK1267
Lens Type	650nm IR Cut
Operating Temperature	-20°C to +70°C
Mating Connector	DF30FC-30DS-0.4V

KLT-M3MA-AR1335 PLCC V3.0
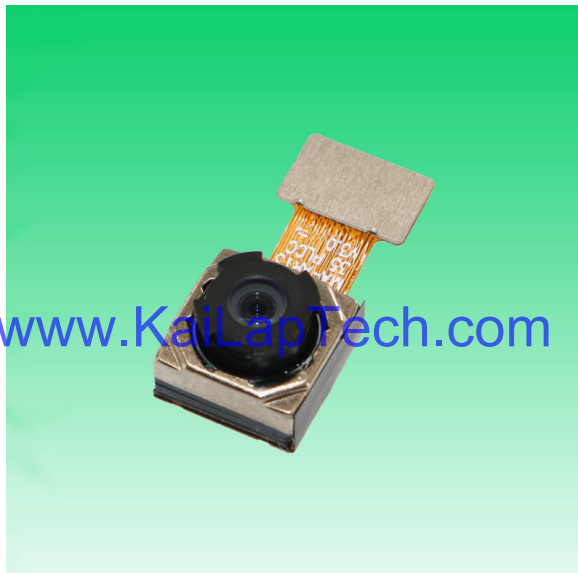### 13MP OnSemi AR1335 PLCC MIPI Interface
Auto Focus Camera Module

Top View
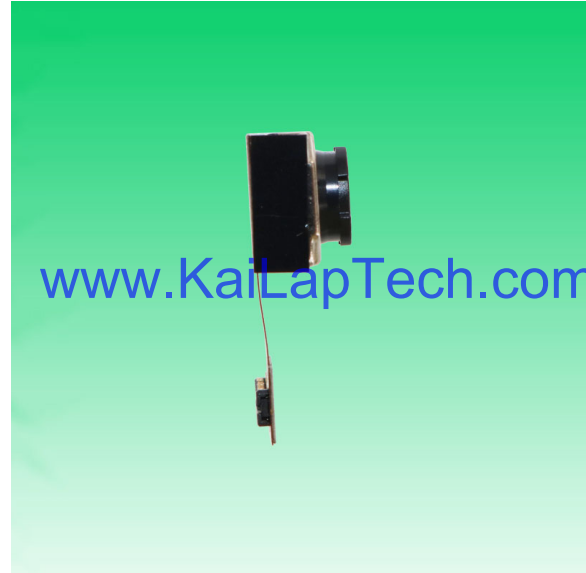
Side View

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Bottom View

Mating Connector

ROHS

PIN	SIGNAL
1	AFVDD 2.8V
2	GPIO[0]
3	DVDD 1.2V
4	DOVDD 1.8V
5	GPIO[1]
6	AGND
7	AVDD 2.8V
8	DGND
9	SDA
10	SCL
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

Parameter:

1、Sensor specification:
Image Sensor: AR1335CSSC32SMD20(PLCC)
Pixel: 1.1um×1.1um
Lens Type: 1/3.2

2、Lens specification:
FOV: 127°(D),99.5°(H),70°(V)
F/NO.: 2.4
TV distortion: <-10.5%
Focal length: 2.35mm

Important Voltage Description: DVDD1.2V
IR Composition: 6P+IR FILTER
IR Cut Coating: 650nm±10nm@50%
(external power supply);

NOTE:
1.The device slave address:0x6C(w),0x6D(r)

TOP VIEW

SIDE VIEW

BOTTOM VIEW

19.57±0.20
5.00±0.10
8.50±0.10
8.00±0.10
8.50±0.10
Ø5.60
Ø6.80
0.86
127°
6.45±0.20(Micro Height)
6.25±0.20(Normal Height)
4.25±0.20(VCM Height)
0.20±0.05 Steel Grounding
0.12±0.03 FPC Adhesiveless FCCL, ED
0.20±0.05 Steel Grounding
DF30FC-30DP-0.4V
2.50
4.00
5.00±0.10

贴批次标签

Capture Direction
3120
4208

Version	Information	Date
V1.0	First Version	10-18-2019
V2.0	Change PIN signal and connector	5-8-2020
V3.0	Add PIN GPIO	8-15-2020

Kai Lap Technologies Group Ltd

Designed By	Kevin	Model Name: KLT-M3MA-AR1335 PLCC V3.0
Checked By	Aouly_Yan	

Projection Type: Third Angle
Scale: 1:1
Unit: mm
Sheet: 1 of 1
Material:
Version: 1/0
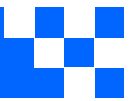
Lens Model: KLT-LENS-TK1267

COMPOSITION:6 ELEMENTS,ALL PLASTIC
SENSOR:1/3.1" CMOS(DIAGONAL=5.7)
EFL=2.35
TTL =5.4±0.1(INFINITY,WITH 0.145mm IR FILER)
FNO=2.4±5% (INFINITE)
FIELD OF VIEW
　　DIAGONAL:106° (Y'=2.85)
TV-DISTORTION (Traditional*2) < -10.5%
RELATIVE ILLUMINANCE=25%(θY'=2.85) (Ref.)
CHIEF RAY ANGLE <33°
MAXIMUM IMAGE CIRCLE:φ6.05

10-Bit DAC 120mA VCM Driver with I^{2}C Interface

Description

The FP5510 is a single 10-bit DAC with 120mA output current voice coil motor (VCM) driver, with an I^{2}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^{2}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.

Features

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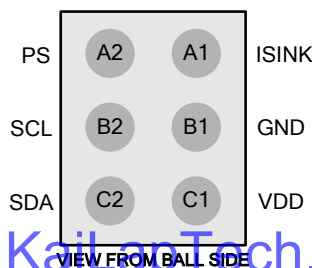- VCM Driver for Auto-Focus
- 10-Bit Resolution Current Sinking of 120mA for VCM
- 2-Wire I^{2}C Interface (1.8V Interface Compatible)
- Internal 4 Slope Control Mechanism
  1. Enhance Slope Control Mode
  2. One Step Mode
  3. Linear Slope Mode
  4. Two Step Slope Mode
- Power-Save Mode Current < 1µA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

Applications

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

Pin Assignments

6-Ball WLCSP

Figure 1. Pin Assignment of FP5510

Ordering Information

FP5510 ☐

Package Type
E2: WLCSP (6-Ball)
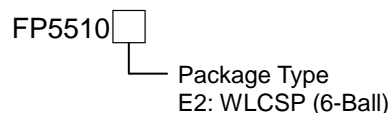
WLCSP-6 (0.7mmx1.1mm) Marking

Part Number	Product Code
FP5510E2	2

0.4 mm Pitch, 0.9 mm Height, Board-to-Board / Board-to-FPC Connectors

DF30 Series

Extremely small size

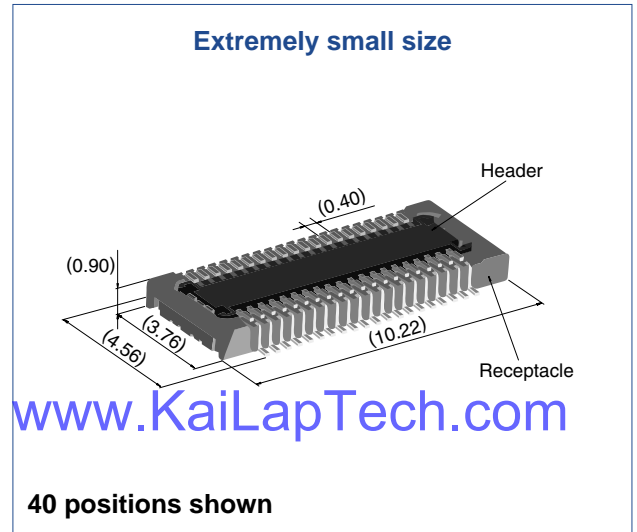(0.40) Header

(0.90)

(4.56) (3.76) (10.22)

Receptacle
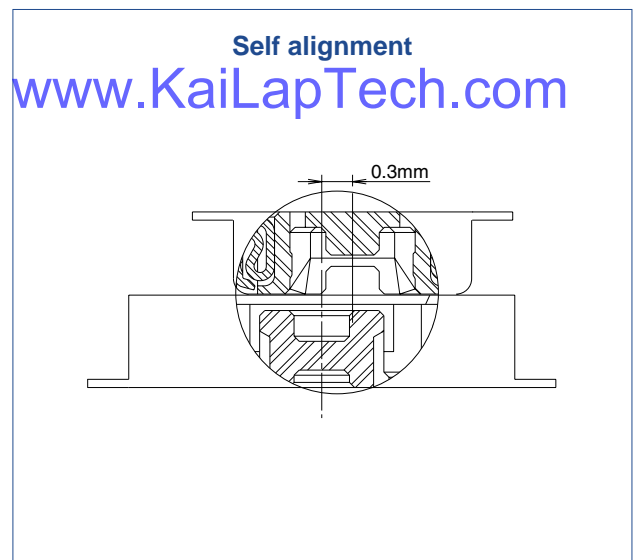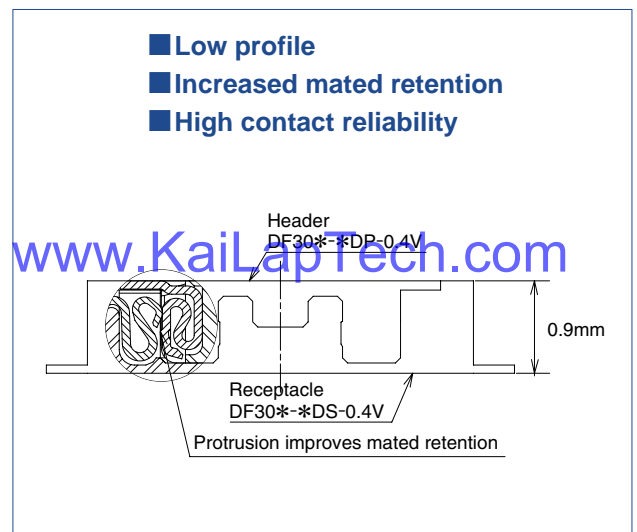
40 positions shown

■Overview

Continuous miniaturization and increased component density on PCB created demand for extremely low profile connectors. This series is addition of a new extremely low profile connectors to Hirose's wide range of high reliability board-to-board/board-to-FPC connection solutions.

■Features

1. Contact reliability

Concentration of the contact's normal forces at the single point assures good contact wipe and electrical reliability, while confirming the fully mated condition with a definite tactile click.

2. Self alignment

Recognizing the difficulties of mating extremely small connectors in limited spaces the connectors will self align in horizontal axis within 0.3 mm.

3. Automatic board placement

Packaged on tape-and-reel the plug and headers have sufficiently large flat areas to allow pick-up with vacuum nozzles of automatic placement equipment.

4. Variety of contact positions and styles

Available in standard contact positions of: 20, 22, 24, 30, 34, 40, 50, 60, 70 and 80 with and without metal fittings. Addition of metal fittings does not affect external dimensionsof the connectors.
Smaller contact positions are also available.

5. Support for continuity test connector

Connectors which have increased insertion and removal durability are available for continuity tests. Contact your Hirose sales representative for details.

■Applications

Cellular phones, PDA's, mobile computers, digital cameras, digital video cameras, and other devices demanding high reliability connections in extremely limited spaces.

■**Low profile**
■**Increased mated retention**
■**High contact reliability**

Header
DF30✱-✱DP-0.4V

0.9mm

Receptacle
DF30✱-✱DS-0.4V

Protrusion improves mated retention

Self alignment

0.3mm

■Product Specifications

Rating	Rated current 0.3A	Operating temperature range : -35℃ to 85℃ (Note 1)	Storage temperature range -10℃ to 60℃ (Note 2)
	Rated voltage 30V AC	Operating humidity range : Relative humidity 20% to 80%	Storage humidity range Relative humidity 40% to 70% (Note 2)

Item	Specification	Conditions
1. Insulation resistance	50 MΩ min.	100V DC
2. Withstanding voltage	No flashover or insulation breakdown.	100V AC / one minute
3. Contact resistance	100 mΩ max.	100 mA
4. Vibration	No electrical discontinuity of 1 μs or more	Frequency: 10 to 55 Hz, single amplitude of 0.75mm, 2 hours, 3 axis
5. Humidity	Contact resistance: 100 mΩ max. Insulation resistance: 25 MΩ min.	96 hours at temperature of 40℃±2℃ and RH of 90% to 95%
6. Temperature cycle	Contact resistance: 100 mΩ max. Insulation resistance: 50 MΩ min.	Temperature: -55℃→+5℃ to +35℃→+85℃→+5℃ to +35℃ Duration: 30→10→30→10(Minutes) 5 cycles
7. Durability (insertions/withdrawals)	Contact resistance: 100 mΩ max.	50 cycles (Connector for conductivity tests: 500 cycles)
8. Resistance to soldering heat	No deformation of components affecting performance.	Reflow: At the recommended temperature profile Manual soldering: 300℃ for 3 seconds

Note 1: Includes temperature rise caused by current flow.
Note 2: The term "storage" refers to products stored for long period of time prior to mounting and use. Operating temperature range and humidity range covers non-conducting condition of installed connectors in storage, shipment or during transportation.

■Materials and Finishes

Connectors	Component	Material	Finish	Remarks
Receptacles and Headers	Insulator	LCP	Color : Black	UL94V-0
	Contacts	Phosphor bronze	Gold plated	———
	Metal fittings	Phosphor bronze	Tin-cupper plated	———

■Ordering information

●Receptacles and Headers

DF30 FC - ✳ DS - 0.4 V (✳✳)

❶ ❷ ❸ ❹ ❺ ❻ ❼

❶ Series name: DF30		❺ Contact pitch: 0.4 mm	
❷ Configuration		❻ Termination section	
FB: With metal fittings, without bosses		V: Straight SMT	
FC: Without metal fittings, without bosses		❼ Packaging	
CJ: Connector for conductivity tests		(81): Embossed tape packaging (5,000 pieces per reel)	
❸ Number of positions: 20, 22, 24, 30, 34, 40, 50, 60, 70, 80		(82): Embossed tape packaging (1,000 pieces per reel)	
❹ Connector type			
DS: Double row receptacle			
DP: Double row header			

HRS

■Receptacles (without metal fittings)

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A
B
P=0.4
Note 2
4.56
3.76
0.15
C
Flat surface
HRS logo
0.9
0.08
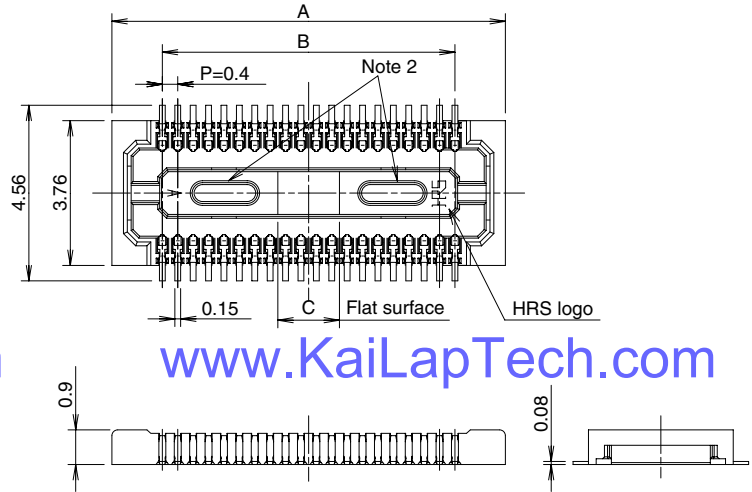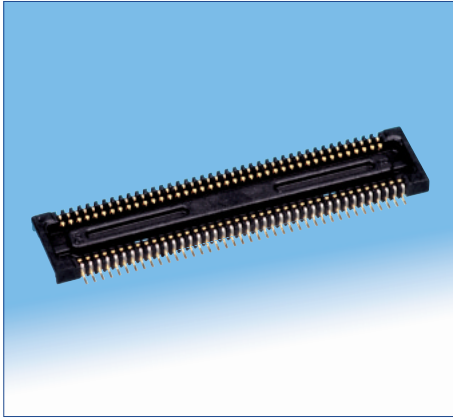
◆Recommended PCB mounting pattern

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B ±0.02
P=0.4 ±0.02
$4.86^{+0.05}_{0}$
$3.46^{0}_{-0.05}$
0.23 ±0.02
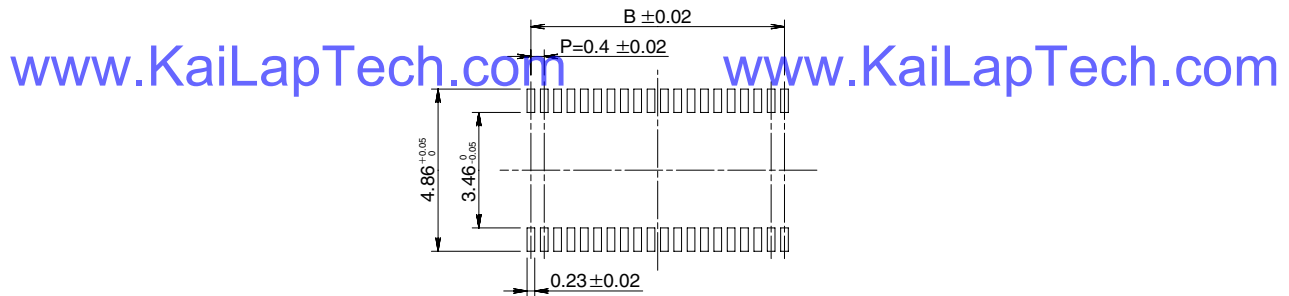
Recommended solder paste thickness: 120 μm

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[Specification number] -∗∗, (∗∗)
(81): Embossed tape packaging (5,000 pieces per reel)

* Tolerances non- accumulative.   Unit: mm

| Part Number	CL No.	Number of contacts	A	B	C
DF30FC-20DS-0.4V(∗∗)	CL684-1109-8-∗∗	20	6.22	3.6	1.2
DF30FC-22DS-0.4V(∗∗)	CL684-1110-7-∗∗	22	6.62	4.0	1.2
DF30FC-24DS-0.4V(∗∗)	CL684-1111-0-∗∗	24	7.02	4.4	1.2
DF30FC-30DS-0.4V(∗∗)	CL684-1112-2-∗∗	30	8.22	5.6	1.2
DF30FC-34DS-0.4V(∗∗)	CL684-1113-5-∗∗	34	9.02	6.4	1.36
DF30FC-40DS-0.4V(∗∗)	CL684-1078-6-∗∗	40	10.22	7.6	1.6
DF30FC-50DS-0.4V(∗∗)	CL684-1114-8-∗∗	50	12.22	9.6	2.0
DF30FC-60DS-0.4V(∗∗)	CL684-1082-3-∗∗	60	14.22	11.6	2.4
DF30FC-70DS-0.4V(∗∗)	CL684-1115-0-∗∗	70	16.22	13.6	2.8
DF30FC-80DS-0.4V(∗∗)	CL684-1116-3-∗∗	80	18.22	15.6	3.2

Note 1: Order by number of reels.

Note 2: Receptacles with 24 or fewer contacts positions will not have recessed areas.

HRS

Product Overview

AR1335: 13 MP 1/3" CMOS Image Sensor

For complete documentation, see the data sheet.
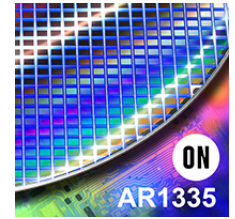
The AR1335 is a 1/3.2-inch CMOS active-pixel digital image sensor with a pixel array of 4208H x 3120V. The AR1335 digital image sensor, features breakthrough 1.1�m pixel technology that delivers superior low-light image quality through leading sensitivity, quantum efficiency and linear full well. This allows image quality that rivals digital still cameras. With a sensor architecture focused on low power and a high Chief Ray Angle (CRA) for low Z-heights, the AR1335 is ideal for smartphone and other mobile device applications. It incorporates sophisticated on-chip camera functions such as windowing, mirroring, column and row skip modes, and snapshot mode. It is programmable through a simple two-wire serial interface. The AR1335 sensor can generate full resolution image at up to 30 frames per second (fps) and supports advanced video modes including 4K 30fps, 1080P 60fps and 720P 120fps.

Features

- 13MP CMOS sensor with advanced 1.1μm pixel BSI technology
- Data interfaces: 2,3 and 4 lane MIPI
- Bit-depth compression available for MIPI: 10-8 and 10-6 to lower bandwidth
- 3D synchronization controls to enable stereo video capture
- 6.8 kbits one time programmable memory (OTPM)
- Programmable controls: gain, horizontal and vertical blanking, auto black level offset correction, frame size/rate, exposure, left-right and top-bottom image reversal, window size, and panning
- Two on-die phase-locked loop (PLL) oscillators for super low noise performance
- On-chip temperature sensor
- Bayer pattern horizontal down-size scaler
- Simple two-wire fast-mode+ serial interface

  For more features, see the data sheet

Applications

- Mobile
- 4K video capture
- High resolution still capture

End Products

- Smart Phone
- Digital Still Camera
- PC Camera
- Consumer devices

Part Electrical Specifications

Product	Compliance	Status	Type	Megapixels	Frame Rate (fps)	Optical Format	Shutter Type	Pixel Size (μm)	Output Interface	Color	Package Type
AR1335CSSC11SMD20	Pb-free / Halide free	Active	CMOS	13	30	1/3.2 inch	Electronic Rolling	1.1 x 1.1	MIPI	RGB	
AR1335CSSC11SMKA0-CP	Pb-free / Halide free	Active	CMOS	13	30	1/3.2 inch	Electronic Rolling	1.1 x 1.1	MIPI	RGB	ODCSP-63
AR1335CSSC11SMKA0-CR	Pb-free / Halide free	Active	CMOS	13	30	1/3.2 inch	Electronic Rolling	1.1 x 1.1	MIPI	RGB	ODCSP-63
AR1335CSSC32SMD20	Pb-free / Halide free	Active	CMOS	13	30	1/3.2 inch	Electronic Rolling	1.1 x 1.1	MIPI	RGB	
AR1335CSSM11SMD20	Pb-free / Halide free	Active	CMOS	13	30	1/3.2 inch	Electronic Rolling	1.1 x 1.1	MIPI	RGB	
AR1335CSSM32SMD20	Pb-free / Halide free	Active	CMOS	13	30	1/3.2 inch	Electronic Rolling	1.1 x 1.1	MIPI	RGB	

Application Diagram
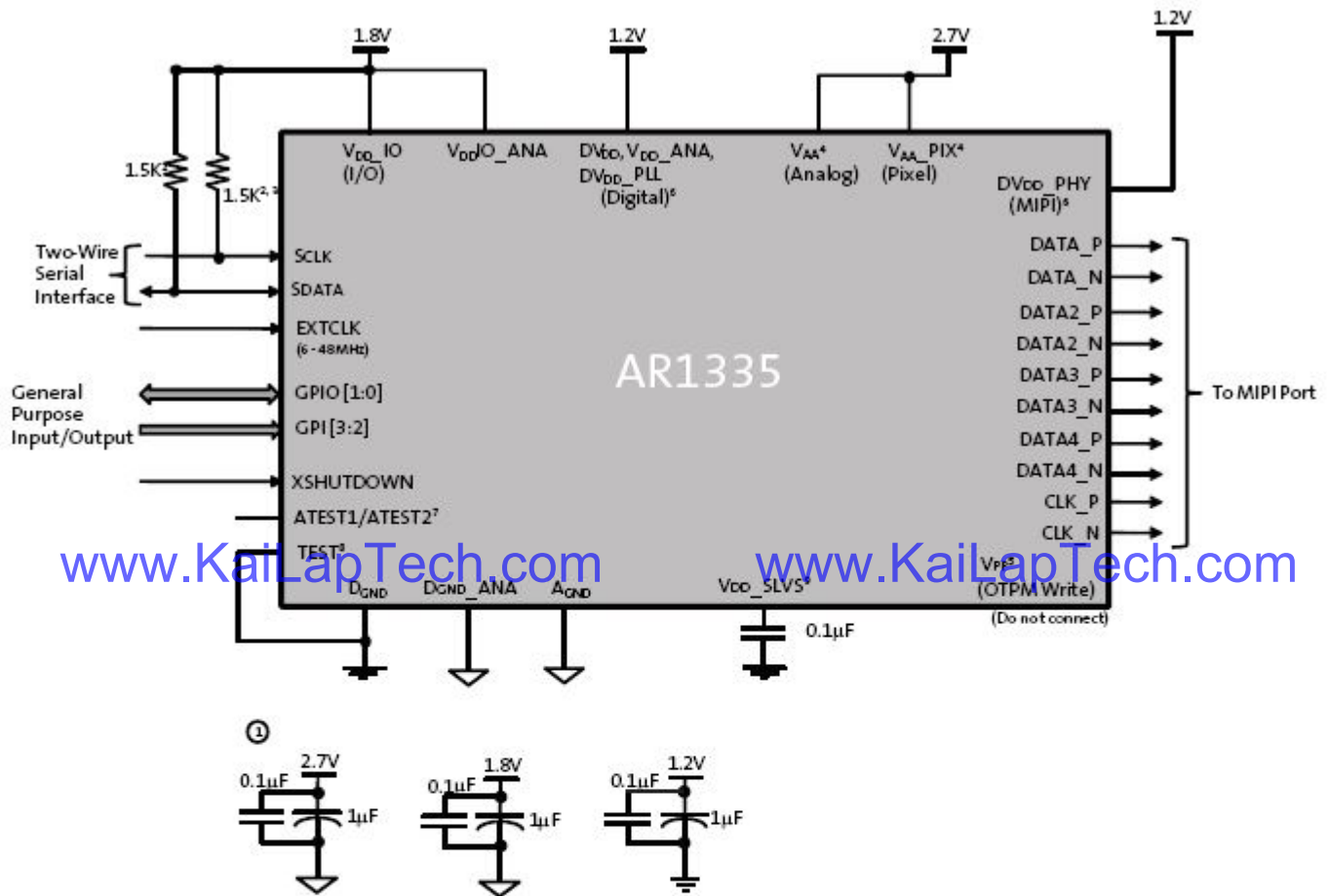
Notes:
1. All power supplies should be adequately decoupled; recommended cap values are:
   - 2.7V: 1.0μF and 0.1μF
   - 1.2V: 1.0uF and 0.1μF
   - 1.8V: 1.0uF and 0.1μF
2. Resistor value 1.5kΩ is recommended, but may be greater for slower two-wire speed.
3. This pull-up resistor is not required if the controller drives a valid logic level on SCLK at all times.
4. VAA and VAA_PIX must be tied together.
5. Internal charge pump is used for OTPM programming.
6. Digital and MIPI supply can be tied together.
7. ATEST1/ATEST2 must be left floating.
8. TEST pin must be tied to DGND.
9. VDD_SLVS must be connected to DGND through a bypass cap (0.1uF)

ON Semiconductor®

1/3.2-Inch 13 Mp CMOS Digital Image Sensor

AR1335 Datasheet, Rev. A

For the latest datasheet, please visit: www.aptina.com

Features

- 13 Mp CMOS sensor with advanced 1.1 µm pixel BSI technology
- Data interfaces: two-, three-, and four-lane serial mobile industry processor interface (MIPI)
- Bit-depth compression available for MIPI Interface: 10-8 and 10-6 to enable lower bandwidth receivers for full frame rate applications
- 3D synchronization controls to enable stereo video capture
- 6.8 kbits one-time programmable memory (OTPM) for storing shading correction coefficients and module information
- Programmable controls: gain, horizontal and vertical blanking, auto black level offset correction, frame size/rate, exposure, left-right and top-bottom image reversal, window size, and panning
- Two on-die phase-locked loop (PLL) oscillators for super low noise performance
- On-chip temperature sensor
- Bayer pattern horizontal down-size scaler
- Simple two-wire fast-mode+ serial interface
- Low dark current
- Interlaced multi-exposure readout enabling High Dynamic Range (HDR) still and video applications
- On-chip lens shading correction
- Support for external mechanical shutter
- Support for external LED or Xenon Flash
- Extended Flash duration up to start of frame readout

Applications

- Cellular phones
- Digital still cameras
- PC cameras
- PDAs

Table 1:   Key Performance Parameters

Parameter		Value
Optical format		1/3.2-Inch 13 Mp (4:3)
Active pixels		4208H x 3120V
Pixel size		1.1µm Back Side Illuminated (BSI)
Chief ray angle (CRA)		32°
Die size		6.3 mm x 5.7 mm
Input clock frequency		6 - 48 MHz
Interface		4-lane MIPI (2- and 3-lane supported); Max data rate: 1.2Gbps/lane
Subsampling modes (column and row)		skip2 bin2 skip3 bin3 skip4 bin4 skip2bin2
ADC resolution		10 bits, on-die
Analog gain		1x – 7.75x
Digital gain		Up to 7.98x
Scaler		Adjustable scaling up to 8x
Temperature sensor		10-bit, controlled by two-wire serial I/F
Compression		DPCM: 10-8-10, 10-6-10
3D support		Frame rate and exposure synchronization
Supply voltage	V_{AA}, V_{AA_PIX}	2.6 - 2.9 V (2.7 V nominal)
	V_{DD_IO}, V_{DDIO_ANA}	1.7 - 1.9 V (1.8 V nominal)
	V_{DD}, V_{DD_ANA}, V_{DD_PLL}, V_{DD_PHY}	1.14 - 1.3 V (1.2 V nominal)
Power consumption		270 mW at 60°C (TYP) at 13 Mp 30 fps
Responsivity		4700 e⁻/lux-sec
SNR_{MAX}		37 dB
Dynamic Range		69 dB
Operating Temperature Range (at junction) - T_J		-30°C to +70°C

Table 2:   Mode of Operation and Power

Mode	Resolution	Readout Configuration	HFOV	FPS	Power Consumption [mW]
4:3 Snapshot Mode					
13 M full resolution	4208x3120	13M full mode	100%	30	270
13 M full resolution	4208x3120	13M full mode	100%	24	250
VGA	640 x 480	Crop+Subsampling+Scaling	61%	120	190
QVGA	320 x 240	Crop+Subsampling+Scaling	30%	240	165
16:9 Video Mode 30 FPS					
4K UHD	3840 x 2160	Cropping	91%	30	230
4K Cinema	4096 x 2160	Cropping	97%	30	235
1080p	1920 x 1080	Crop+Subsampling+Scaling	91%	30	160
1080p LP	1920 x 1080	Crop+Subsampling+Scaling	91%	30	135
720p	1280 x 720	Crop+Subsampling+Scaling	91%	30	140
16:9 Video Mode 60 FPS					
1080p	1920 x 1080	Crop+Subsampling+Scaling	91%	60	210
1080p LP	1920 x 1080	Crop+Subsampling+Scaling	91%	60	180
720p	1280 x 720	Crop+Subsampling+Scaling	91%	60	175
3M 30 FPS					
3M	2000 x 1500	Crop+Subsampling+Scaling	95%	30	195
3M LP	2000 x 1500	Crop+Subsampling+Scaling	95%	30	170
16:9 Video Mode 120 FPS					
720p	1280 x 720	Crop+Subsampling+Scaling	91%	120	260

Ordering Information

Table 3:   Available Part Numbers

Part Number	Description
AR1335CSSC32SMD20	Bare die

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

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

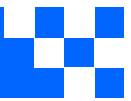www.KaiLapTech.com   www.KaiLapTech.com

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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

| Inspection Item		Inspection Method	Standard of Inspection
Category	Item		
Appearance	FPC/ PCB — Color	The Naked Eye	Major Difference is Not Allowed.
	FPC/ PCB — Be Torn/Chopped	The Naked Eye	Copper Crack Exposure is Not Allowed.
	FPC/ PCB — Marking	The Naked Eye	Clear, Recognizable (Within 30cm Distance)
	Holder — Scratches	The Naked Eye	The Inside Crack Exposure is Not Allowed
	Holder — Gap	The Naked Eye	Meet the Height Standard
	Holder — Screw	The Naked Eye	Make Sure Screws Are Presented (If Any)
	Holder — Damage	The Naked Eye	The Inside Crack Exposure is Not Allowed
	Lens — Scratch	The Naked Eye	No Effect On Resolution Standard
	Lens — Contamination	The Naked Eye	No Effect On Resolution Standard
	Lens — Oil Film	The Naked Eye	No Effect On Resolution Standard
	Lens — Cover Tape	The Naked Eye	No Issue On Appearance.
Function	Image — No Communication	Test Board	Not Allowed
	Image — Bright Pixel	Black Board	Not Allowed In the Image Center
	Image — Dark Pixel	White board	Not Allowed In the Image Center
	Image — Blurry	The Naked Eye	Not Allowed
	Image — No Image	The Naked Eye	Not Allowed
	Image — Vertical Line	The Naked Eye	Not Allowed
	Image — Horizontal Line	The Naked Eye	Not Allowed
	Image — Light Leakage	The Naked Eye	Not Allowed
	Image — Blinking Image	The Naked Eye	Not Allowed
	Image — Bruise	Inspection Jig	Not Allowed
	Image — Resolution	Chart	Follows Outgoing Inspection Chart Standard
	Image — Color	The Naked Eye	No Issue
	Image — Noise	The Naked Eye	Not Allowed
	Image — Corner Dark	The Naked Eye	Less Than 100px By 100px
	Image — 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
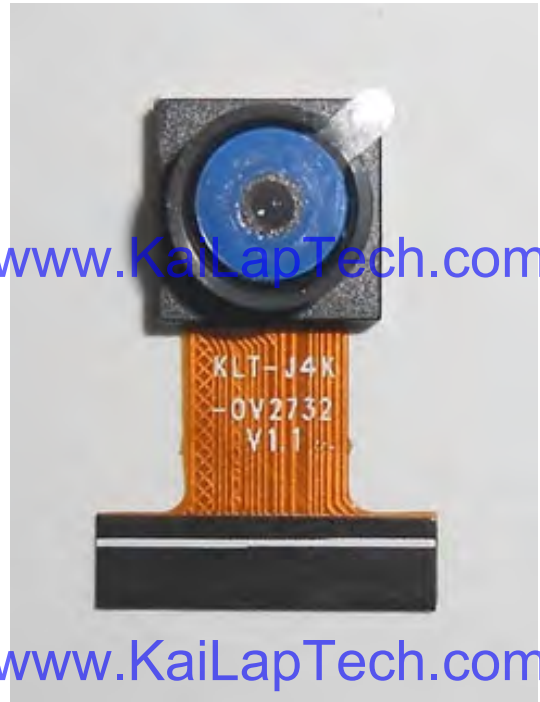
Tray with Grid and Space

Place Cameras on the Tray

KLT

your BEST camera module partner

Camera Modules Package Solution

Full Tray of Cameras

Cover Tray with Lid

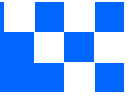Put Tray into Anti-Static Bag

Vacuum the Anti-Static Bag

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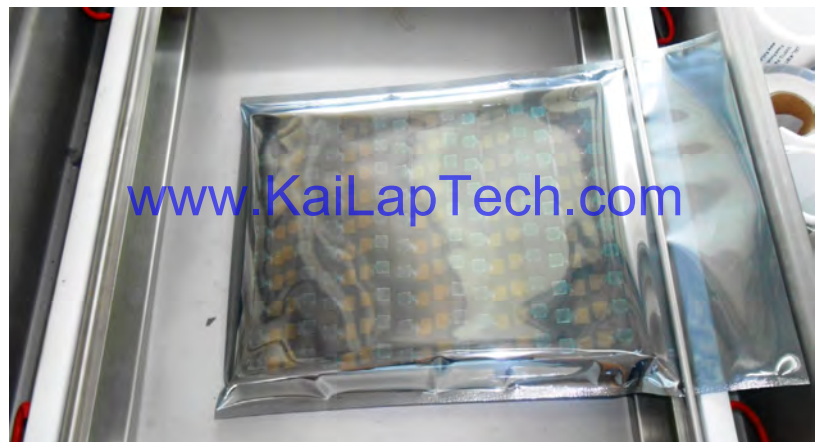
Camera Modules Package Solution

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

www.KaiLapTech.com

Foam Sheets are Slightly Larger than Trays

www.KaiLapTech.com

Place Foam Sheets and Trays into Box

Foam Sheets are Tightly Fitting Box
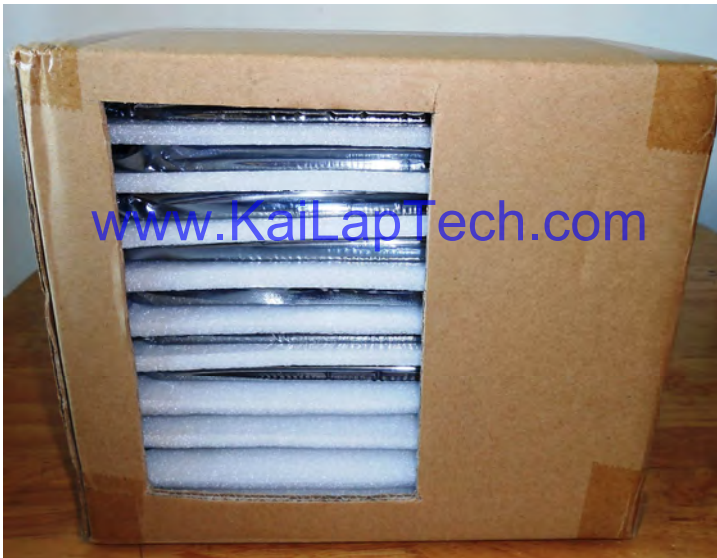
Small Order Package Solution

Place Foam Sheets and Trays into Small Box

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Foam Sheets are Nicely Fitting the Small Box

www.KaiLapTech.com

www.KaiLapTech.com

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

your BEST camera module partner

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.

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