

KLT-M3MA-AR1335 V23**13MP OnSemi AR1335 MIPI Interface Auto Focus Camera Module**

Front View



Back View

Specifications

Camera Module No.	KLT-M3MA-AR1335 V23
Resolution	13MP
Image Sensor	AR1335
Sensor Type	1/3.2"
Pixel Size	1.1 um x 1.1 um
EFL	3.81 mm
F.NO	2.20
Pixel	4208 x 3120
View Angle	74.4°(DFOV) 62.7°(HFOV) 48.7°(VFOV)
Lens Dimensions	8.50 x 8.50 x 5.60 mm
Module Size	55.00 x 8.50 mm
Module Type	Auto Focus
Interface	MIPI
Auto Focus VCM Driver IC	FP5510
Lens Type	650nm IR Cut
Operating Temperature	-30°C to +70°C
Mating Connector	DF30FC-30DS-0.4V

KLT-M3MA-AR1335 V23**13MP OnSemi AR1335 MIPI Interface Auto Focus Camera Module**

Top View



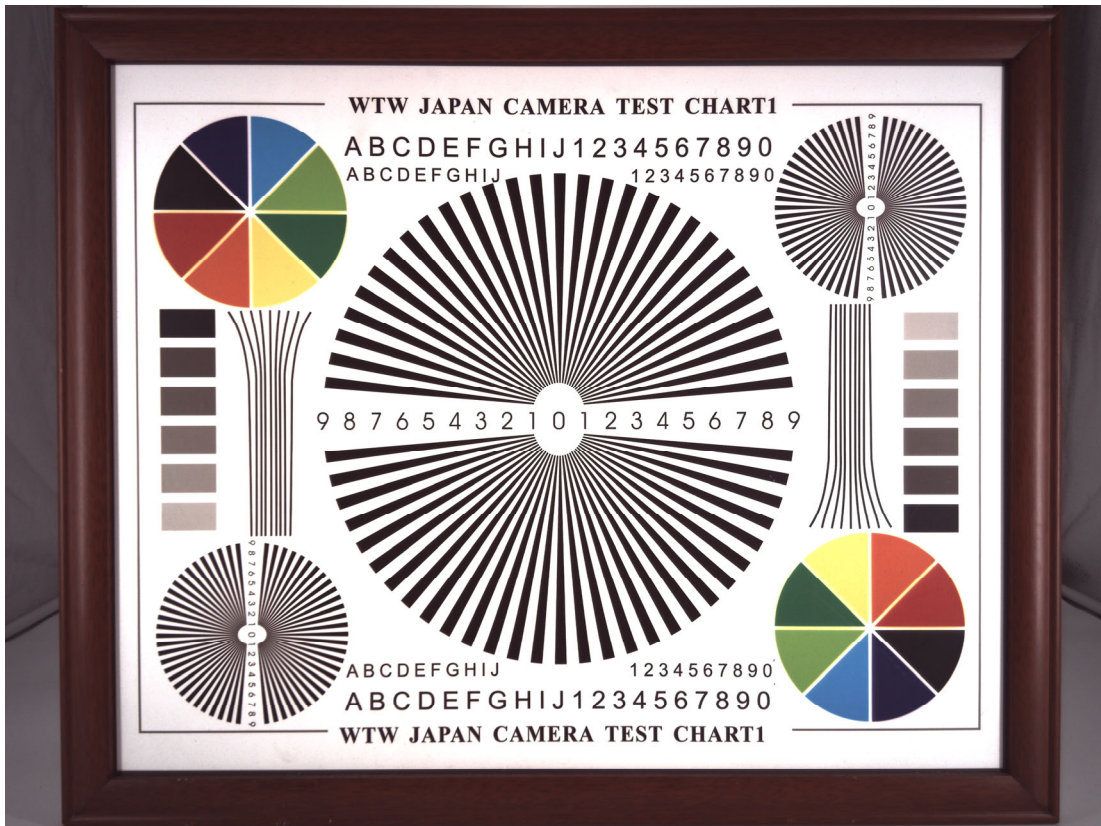
Side View



Bottom View



Mating Connector





Periodic table of Elements

GROUP 1 1,008 H Hydrogen

2 4,002 He Helium

3 6,941 Li Lithium

4 9,012 Be Beryllium

5 10,81 B Boron

6 12,01 C Carbon

7 14,01 N Nitrogen

8 16,00 O Oxygen

9 18,99 F Fluorine

10 20,18 Ne Neon

11 22,99 Na Sodium

12 24,31 Mg Magnesium

13 26,98 Al Aluminium

14 28,08 Si Silicon

15 30,97 P Phosphorus

16 32,07 S Sulfur

17 35,45 Cl Chlorine

18 39,95 Ar Argon

19 39,09 K Potassium

20 40,08 Ca Calcium

21 44,96 Sc Scandium

22 47,87 Ti Titanium

23 50,94 V Vanadium

24 51,99 Cr Chromium

25 54,94 Mn Manganese

26 55,85 Fe Iron

27 58,93 Co Cobalt

28 58,69 Ni Nickel

29 63,55 Cu Copper

30 65,39 Zn Zinc

31 69,72 Ga Gallium

32 72,61 Ge Germanium

33 74,92 As Arsenic

34 78,96 Se Selenium

35 79,90 Br Bromine

36 83,80 Kr Krypton

37 85,47 Rb Rubidium

38 87,62 Sr Strontium

39 88,91 Y Yttrium

40 91,22 Zr Zirconium

41 92,91 Nb Niobium

42 95,94 Mo Molybdenum

43 97,94 Tc Technetium

44 101,1 Ru Ruthenium

45 102,9 Rh Rhodium

46 106,4 Pd Palladium

47 107,9 Ag Silver

48 112,4 Cd Cadmium

49 114,8 In Indium

50 118,7 Sn Tin

51 121,8 Sb Antimony

52 127,6 Te Tellurium

53 126,9 I Iodine

54 131,3 Xe Xenon

55 132,9 Cs Cesium

56 137,3 Ba Barium

57-71 Lanthanides

72 178,5 Hf Hafnium

73 180,9 Ta Tantalum

74 183,8 W Tungsten

75 186,2 Re Rhenium

76 187,6 Os Osmium

77 192,2 Ir Iridium

78 195,1 Pt Platinum

79 196,9 Au Gold

80 200,6 Hg Mercury

81 204,4 Tl Thallium

82 207,2 Pb Lead

83 208,9 Bi Bismuth

84 209 Po Polonium

85 210 At Astatine

86 222 Rn Radon

87 223 Fr Francium

88 226 Ra Radium

89-103 Actinides

104 261 Rf Rutherfordium

105 262 Db Dubnium

106 263 Sg Seaborgium

107 264 Bh Bohrium

108 265 Hs Hassium

109 266 Mt Meitnerium

110 268 Ds Darmstadtium

111 270 Rg Roentgenium

112 281 Cn Copernicium

113 284 Nh Nihonium

114 289 Fl Flerovium

115 288 Mc Moscovium

116 292 Lv Livermorium

117 294 Ts Tennessine

118 294 Og Oganesson

119 261 La Lanthanum

120 138,9 Ce Cerium

121 140,1 Pr Praseodymium

122 140,9 Nd Neodymium

123 144,2 Pm Promethium

124 145 Sm Samarium

125 150,4 Eu Europium

126 151,9 Gd Gadolinium

127 157,2 Tb Terbium

128 158,9 Dy Dysprosium

129 162,5 Ho Holmium

130 164,9 Er Erbium

131 167,2 Tm Thulium

132 168,9 Yb Ytterbium

133 173 Lu Lutetium

134 232 Ac Actinium

135 232 Th Thorium

136 232 Pa Protactinium

137 238 U Uranium

138 238 Np Neptunium

139 239 Pu Plutonium

140 243 Am Americium

141 243 Cm Curium

142 247 Bk Berkeleium

143 251 Cf Californium

144 252 Es Einsteinium

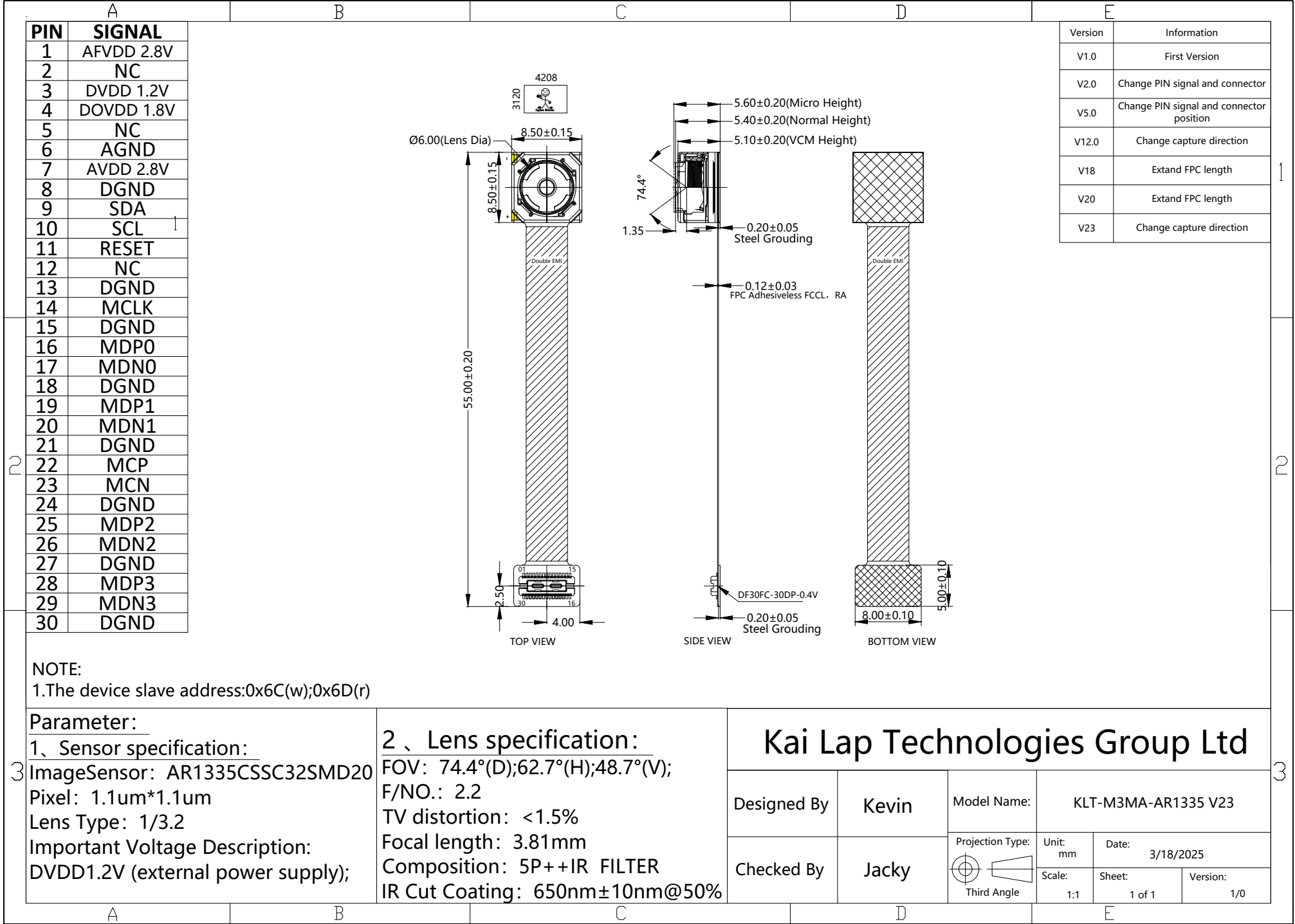
145 252 Fm Fermium

146 257 Md Mendelevium

147 258 No Nobelium

148 260 Lr Lawrencium

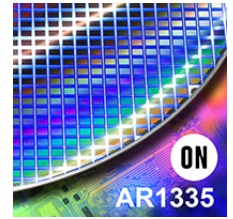




Product Overview

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 μm 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 1.1 μm 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

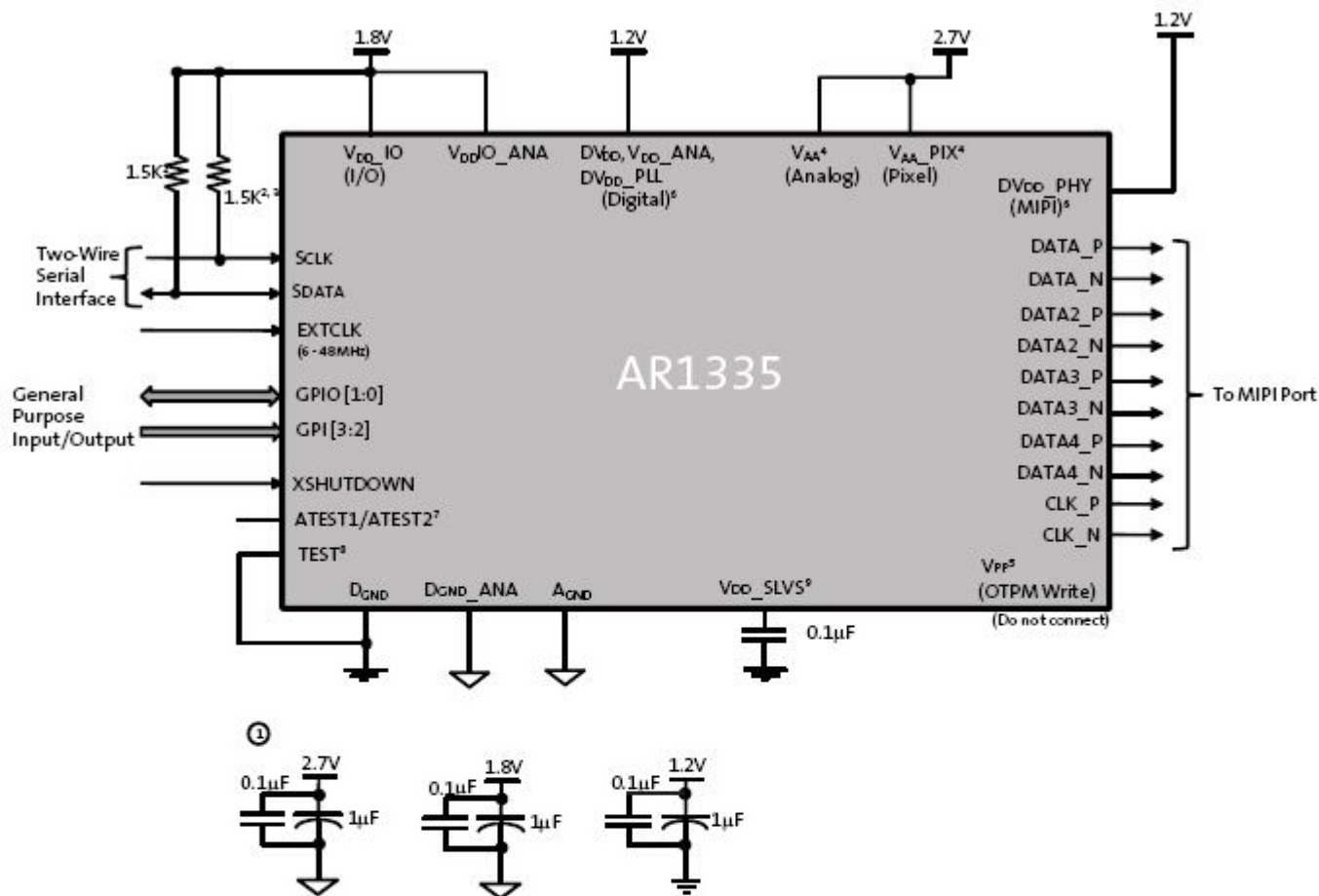
End Products

- 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



For connectivity above:

- Notes:
1. All power supplies should be adequately decoupled; recommended cap values are:
 - 2.7V: 1.0 μ F and 0.1 μ F
 - 1.2V: 1.0 μ F and 0.1 μ F
 - 1.8V: 1.0 μ F and 0.1 μ F
 2. Resistor value 1.5k Ω 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 (0.1 μ F).

For more information please contact your local sales support at www.onsemi.com.

Created on: 9/30/2017



1/3.2-Inch 13 Mp CMOS Digital Image Sensor

AR1335 Datasheet, Rev. A

For the latest datasheet, please visit: www.aplina.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	1.1 μm 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	VAA, VAA_PIX 2.6 - 2.9 V (2.7 V nominal)
	VDD_IO, VDDIO_ANA 1.7 - 1.9 V (1.8 V nominal)
	VDD, VDD_ANA, VDD_PLL, VDD_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
SNRMAX	37 dB
Dynamic Range	69 dB
Operating Temperature Range (at junction) - TJ	-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

10-Bit DAC 120mA VCM Driver with I²C Interface

Description

The FP5510 is a single 10-bit DAC with 120mA output current voice coil motor (VCM) driver, with an I²C-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 I²C 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 I²C 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

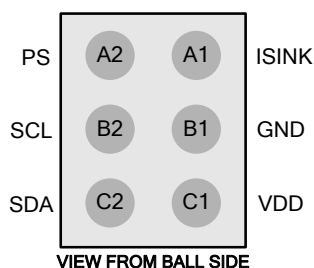



Figure 1. Pin Assignment of FP5510

Ordering Information

FP5510  Package Type
E2: WLCSP (6-Ball)

WLCSP-6 (0.7mm×1.1mm) Marking

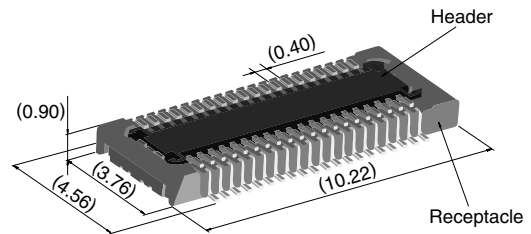
Part Number	Product Code
FP5510E2	2

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

DF30 Series



Extremely small size



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 dimensions of 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



Self alignment



■Product Specifications

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

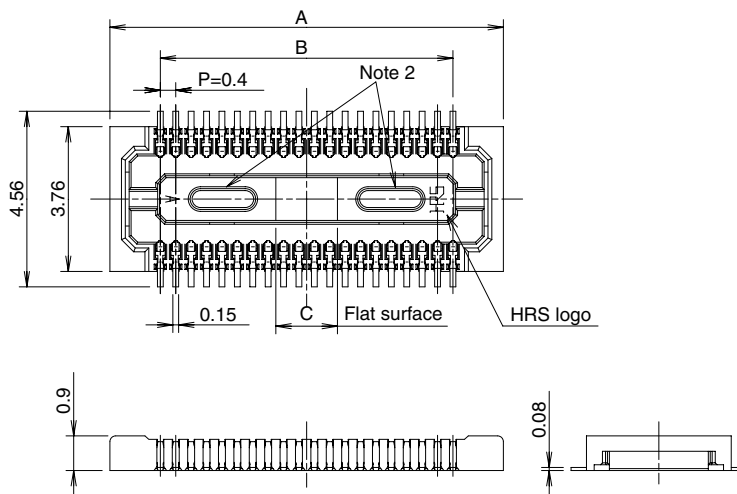
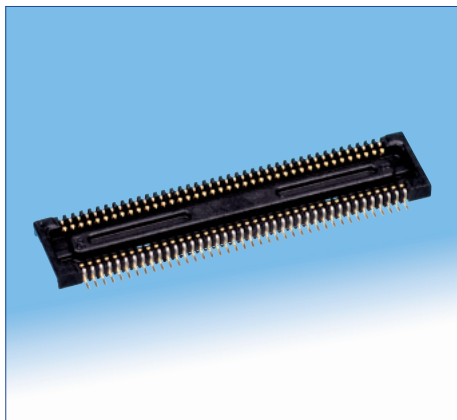
■Ordering information

●Receptacles and Headers

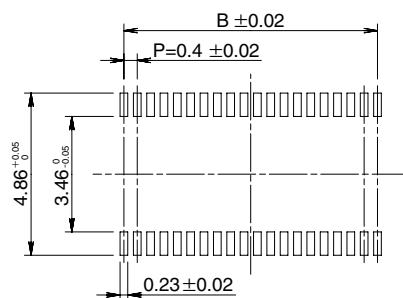
DF30 FC - * DS - 0.4 V (**)
 ① ② ③ ④ ⑤ ⑥ ⑦

① Series name: DF30	⑤ Contact pitch: 0.4 mm
② Configuration FB: With metal fittings, without bosses FC: Without metal fittings, without bosses CJ: Connector for conductivity tests	⑥ Termination section V: Straight SMT
③ Number of positions: 20, 22, 24, 30, 34, 40, 50, 60, 70, 80	⑦ Packaging (81): Embossed tape packaging (5,000 pieces per reel) (82): Embossed tape packaging (1,000 pieces per reel)
④ Connector type DS: Double row receptacle DP: Double row header	

■Receptacles (without metal fittings)



◆Recommended PCB mounting pattern



Recommended solder paste thickness: 120 μ m

[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.

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

your BEST camera module partner



IMAGING DEVICES



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
VSYNCS XVS FSYNCS	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

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	Not Allowed
			Bright Pixel	Black Board	Not Allowed In the Image Center
Dark Pixel			White board	Not Allowed In the Image Center	
Blurry			The Naked Eye	Not Allowed	
No Image			The Naked Eye	Not Allowed	
Vertical Line			The Naked Eye	Not Allowed	
Horizontal Line			The Naked Eye	Not Allowed	
Light Leakage			The Naked Eye	Not Allowed	
Blinking Image			The Naked Eye	Not Allowed	
Bruise			Inspection Jig	Not Allowed	
Resolution			Chart	Follows Outgoing Inspection Chart Standard	
Color			The Naked Eye	No Issue	
Noise			The Naked Eye	Not Allowed	
Corner Dark			The Naked Eye	Less Than 100px By 100px	
Color Resolution			The Naked Eye	No Issue	
Dimension			Height	The Naked Eye	Follows Approval Data Sheet
	Width	The Naked Eye	Follows Approval Data Sheet		
	Length	The Naked Eye	Follows Approval Data Sheet		
	Overall	The Naked Eye	Follows Approval Data Sheet		

KLT Package Solutions

KLT Camera Module



Complete with Lens Protection Film



Tray with Grid and Space



Place Cameras on the Tray



Camera Modules Package Solution

Full Tray of Cameras



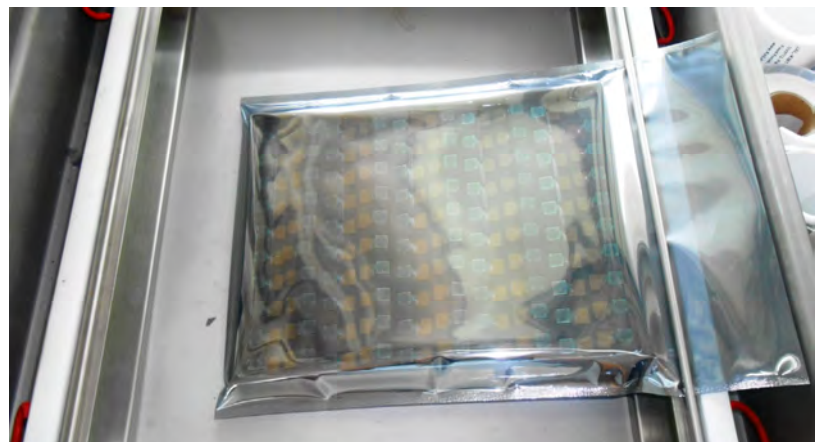
Cover Tray with Lid



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



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



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



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





CMOS CAMERA MODULES



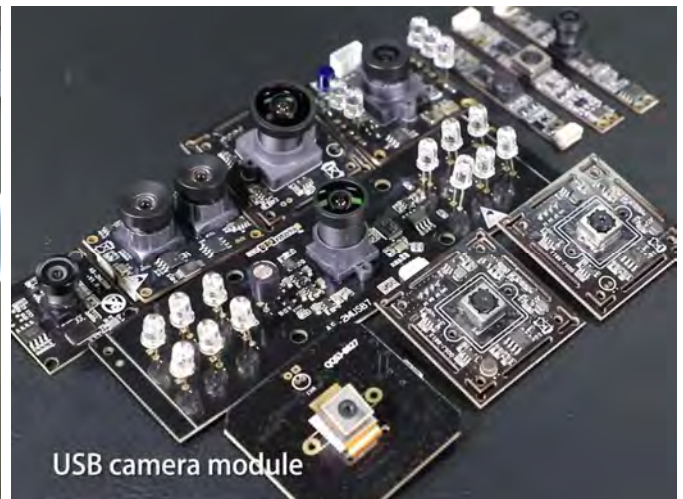
your BEST camera module partner

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.



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 subsequent events.



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CMOS CAMERA MODULES



your BEST camera module partner

KLT Strength

Powerful Factory



Professional Service



Promised Delivery



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