

## KLT-RPA89-IMX219 V2.0

## 8MP Sony IMX219 MIPI Interface PCBA Auto Focus Camera Module



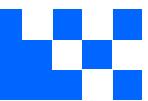
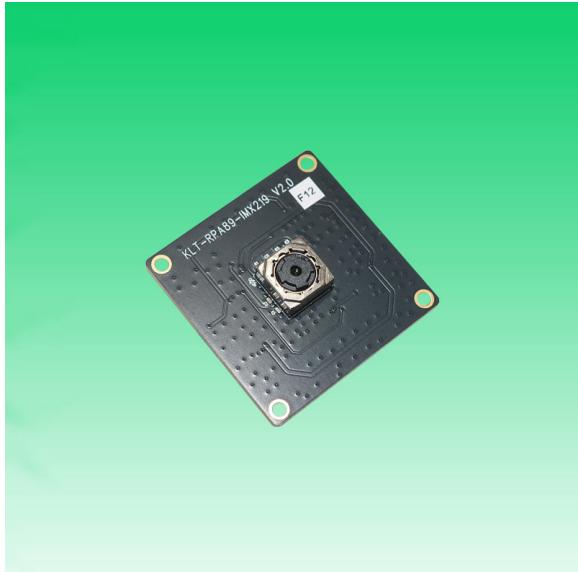
Front View



Back View

## Specifications

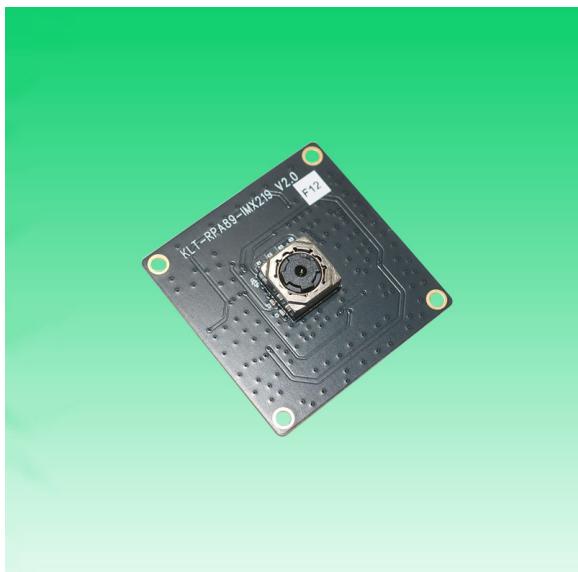
Camera Module No.	KLT-RPA89-IMX219 V2.0
Resolution	8MP
Image Sensor	IMX219
Sensor Type	1/4"
Pixel Size	1.12 um x 1.12 um
EFL	2.96 mm
F.NO	2.00
Pixel	3264 x 2448
View Angle	75.0°(DFOV) 62.8°(HFOV) 49.3°(VFOV)
Lens Dimensions	8.50 x 8.50 x 6.10 mm
Module Size	32.00 x 32.00 mm
Module Type	Auto Focus
Interface	MIPI
Auto Focus VCM Driver IC	DW9714P
Lens Type	650nm IR Cut
Operating Temperature	-20°C to +60°C
Mating Connector	Ribbon Cable

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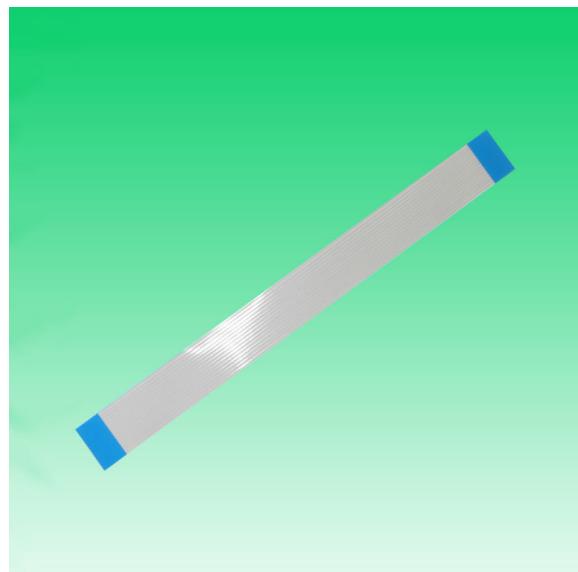
Top View



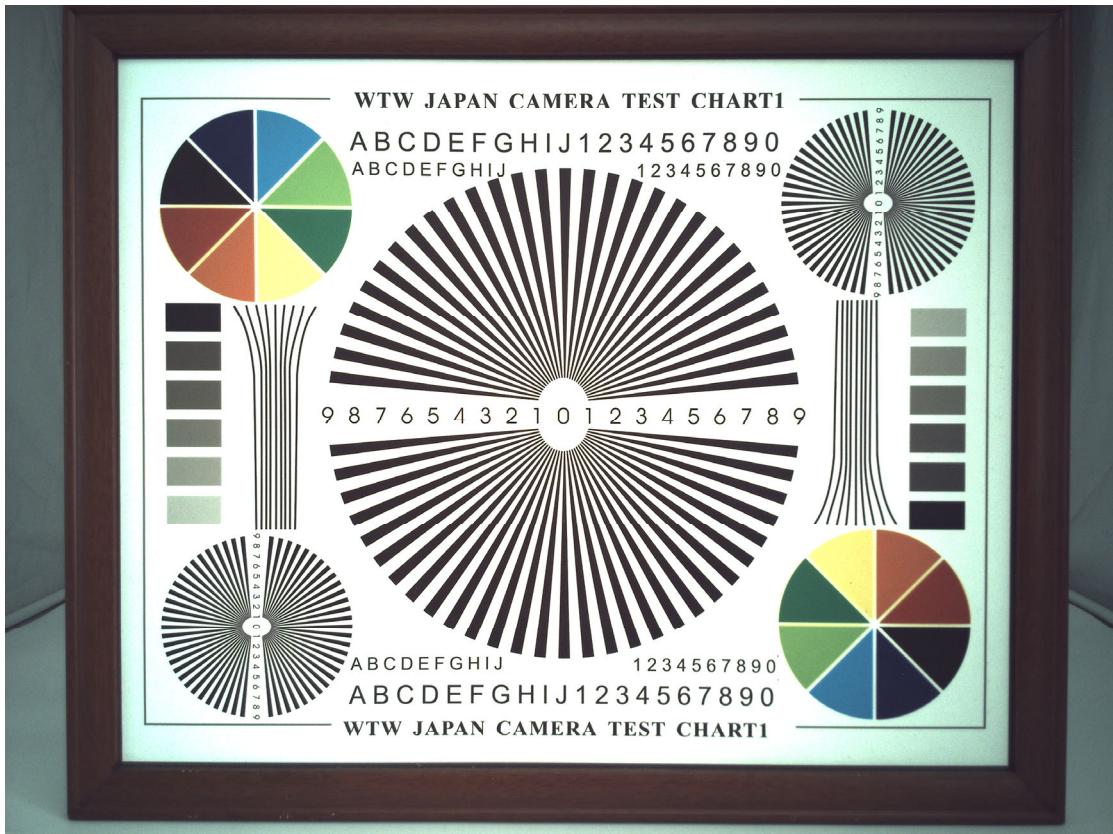
Side View



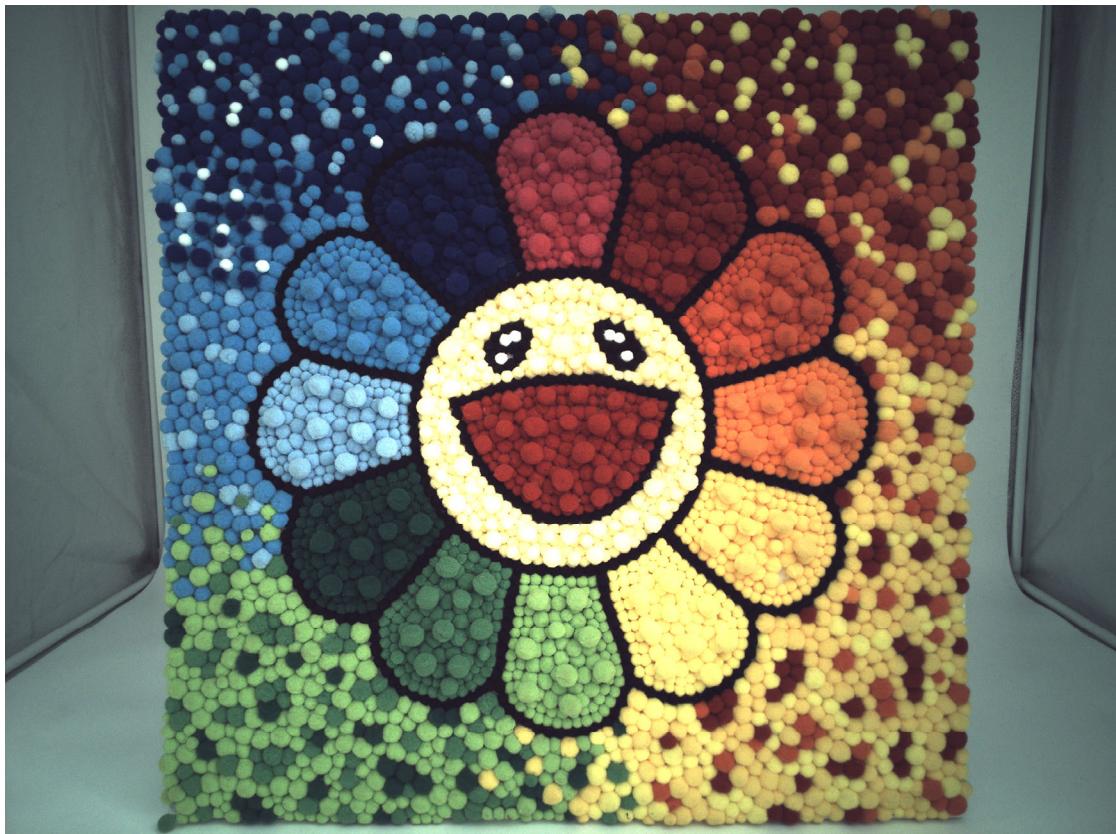
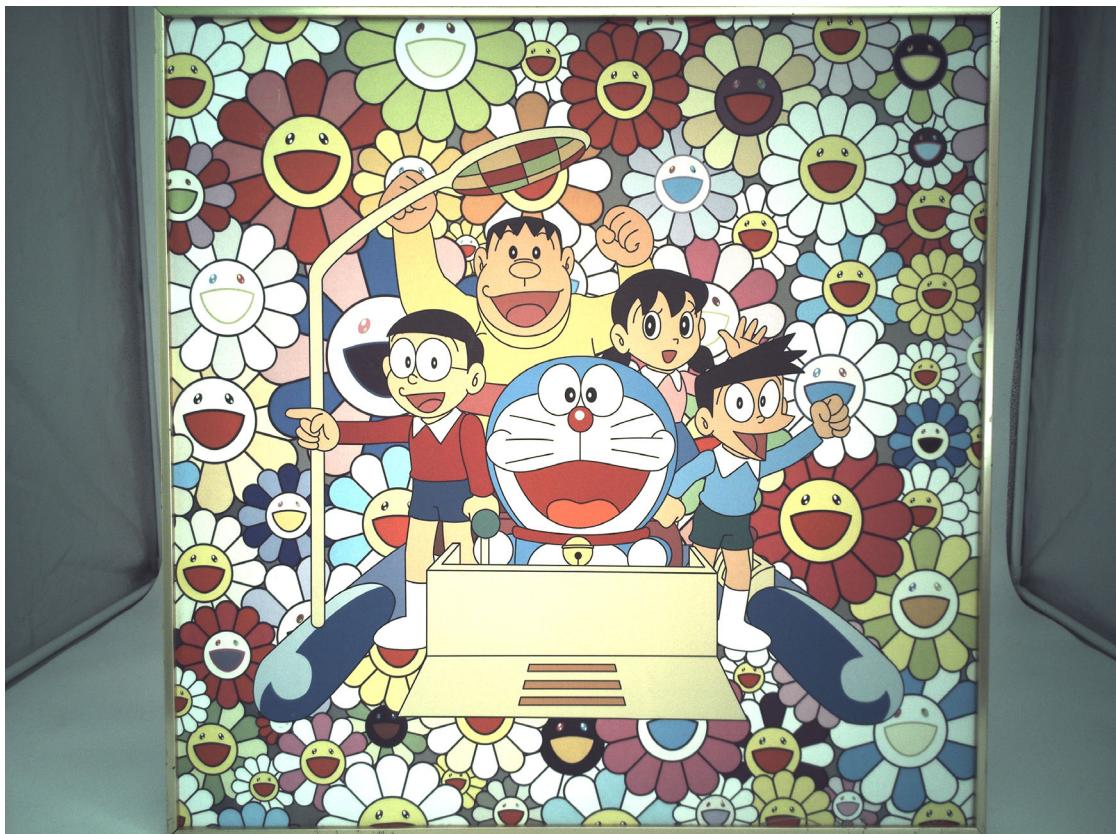
Bottom View

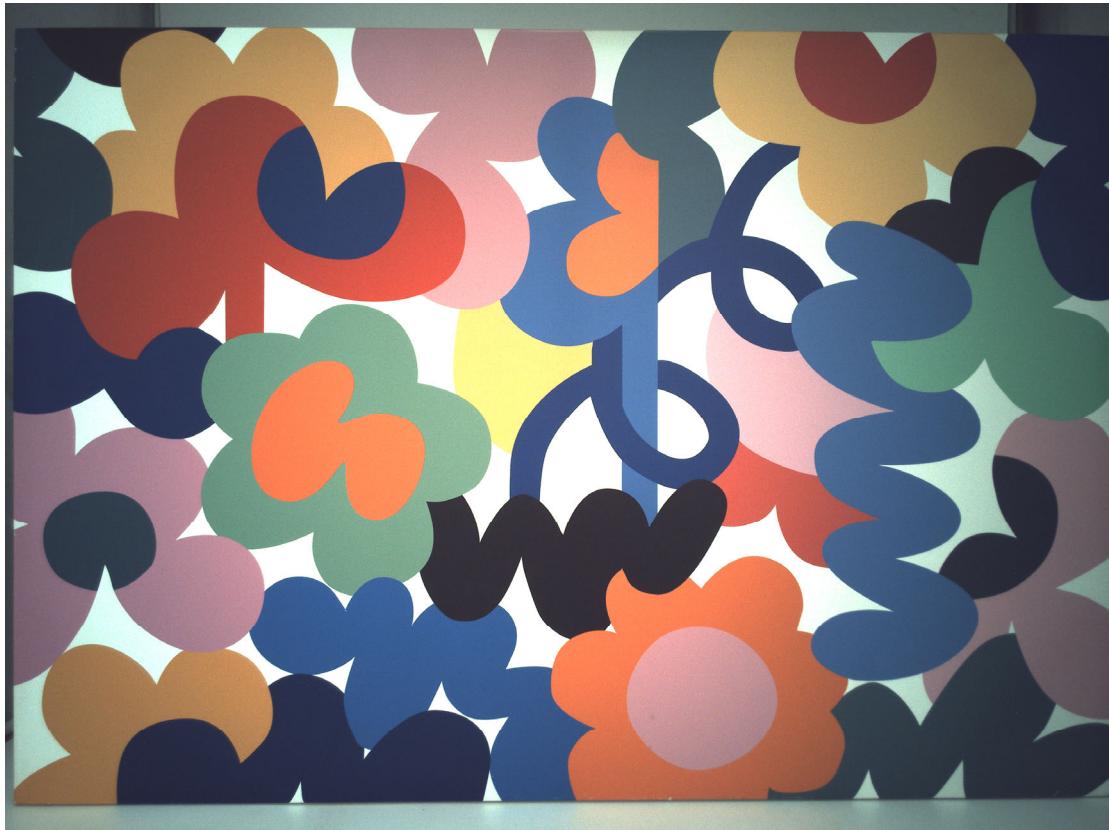
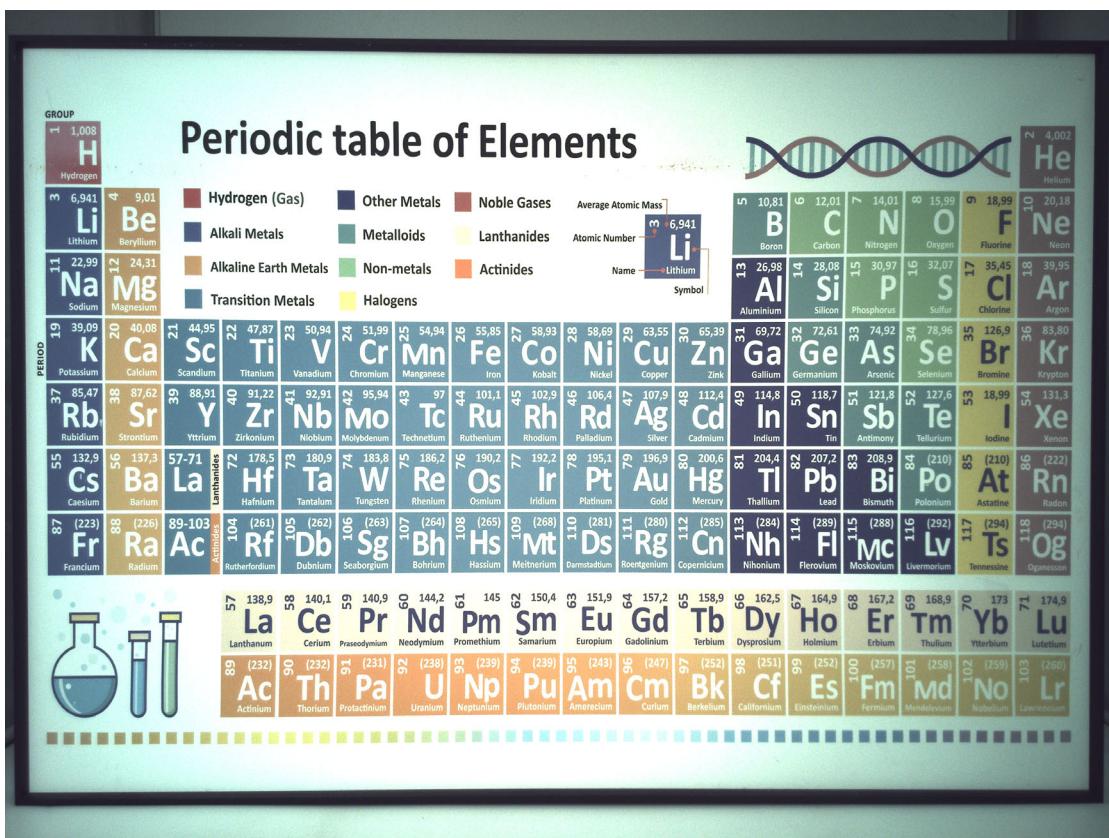


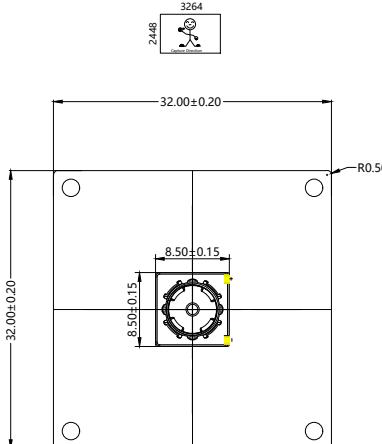
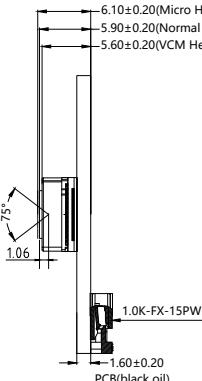
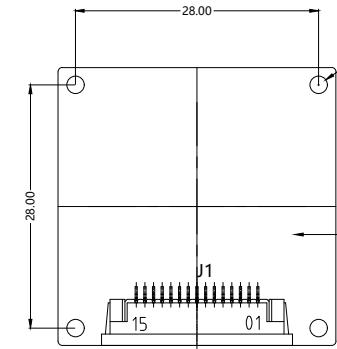
Mating Connector



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<p>NOTE:</p> <p>1.The device slave address:0x20;</p>				<p><b>Kai Lap Technologies Group Ltd</b></p> <table border="1"> <tr> <td>Designed By</td> <td>Kevin</td> <td>Model Name:</td> <td colspan="3">KLT-RPA89-IMX219 V2.0</td> </tr> <tr> <td>Checked By</td> <td>Jacky</td> <td>Projection Type:</td> <td>Unit: mm</td> <td>Date:</td> <td>10/29/2025</td> </tr> <tr> <td></td> <td></td> <td>Third Angle</td> <td>Scale: 1:1</td> <td>Sheet: 1 of 1</td> <td>Version: 1/0</td> </tr> </table>				Designed By	Kevin	Model Name:	KLT-RPA89-IMX219 V2.0			Checked By	Jacky	Projection Type:	Unit: mm	Date:	10/29/2025			Third Angle	Scale: 1:1	Sheet: 1 of 1	Version: 1/0																																																																																
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<p><b>Parameters:</b></p> <p><b>1. Sensor specification:</b> Image Sensor: IMX219 Pixel: 1.12um*1.12um Lens Type: 1/4 Important Voltage Description: VCC 3.3V (external power supply);</p>				<p><b>2. Lens specification:</b> FOV: 75°(D);62.8°(H);49.3°(V); F/NO.: 2.0 TV distortion: &lt;1.0% Focal length: 2.96mm Composition: 5P+IR FILTER IR Cut Coating: 650nm±10nm@50%</p>																																																																																																					
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# [Product Brief]

Ver.1.0

# **IMX219PQ**

**Diagonal 4.60mm (Type 1/4.0) 8M Pixel CMOS Image Sensor with Square Pixel for Color Cameras**

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## **Description**

IMX219PQ is a diagonal 4.60mm (Type 1/4.0) CMOS active pixel type image sensor with a square pixel array and 8.08M effective pixels. This chip operates with three power supplies, analogue 2.8V, digital 1.2 V, and IF 1.8 V, and has low power consumption. High sensitivity, low dark current, and no smear are achieved through the adoption of R, G, and B primary color pigment mosaic filters. This chip features an electronic shutter with variable charge-storage time.

In addition, this product is designed for use in cellular phone and tablet pc. When using this for another application, Sony does not guarantee the quality and reliability of product. Therefore, don't use this for applications other than cellular phone and tablet pc. Consult your Sony sales representative if you have any questions.

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## **Functions and Features**

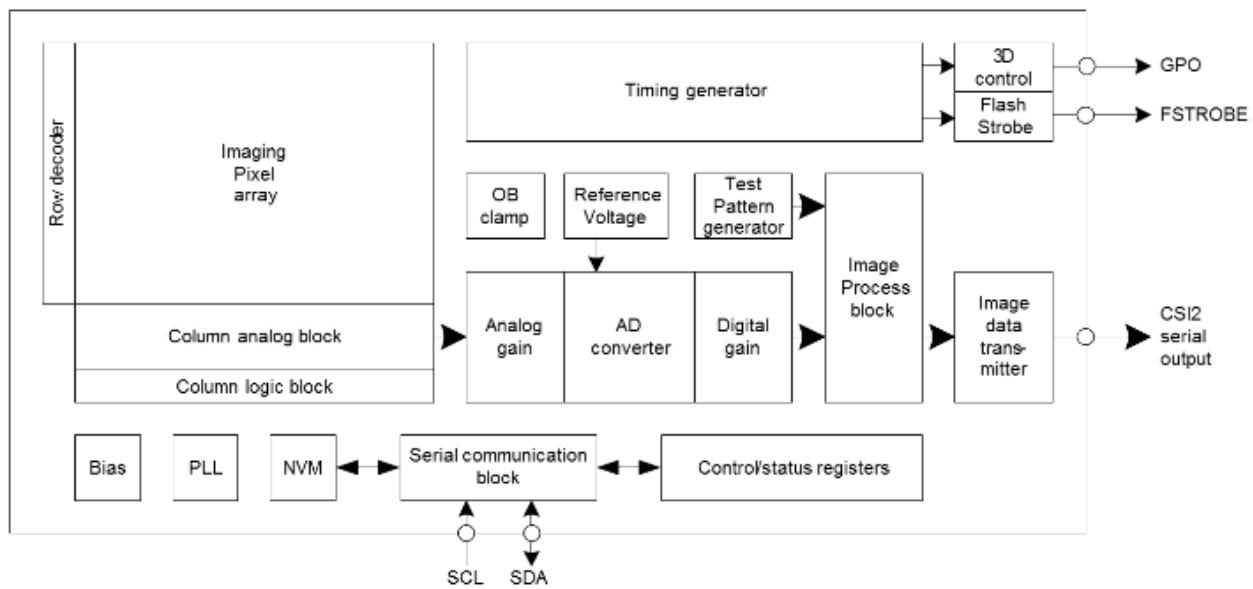
- ◆ Back-illuminated CMOS image sensor Exmor R™
- ◆ 2-wire serial communication circuit on chip
- ◆ CSI2 serial data output (selection of 4lane/2lane)
- ◆ Timing generator, H and V driver circuits on chip
- ◆ CDS/PGA on chip
- ◆ 10-bit A/D converter on chip
- ◆ Automatic optical black (OB) clamp circuit on chip
- ◆ PLL on chip (rectangular wave)
- ◆ High sensitivity, low dark current, no smear
- ◆ Excellent anti-blooming characteristics
- ◆ Variable-speed shutter function (1 H units)
- ◆ R, G, B primary color pigment mosaic filters on chip
- ◆ Max. 30frame/s in all-pixel scan mode
- ◆ Pixel rate: 280 [Mpixel/s] (All-pixels mode)
- ◆ 180 frame/s @720p with 2x2 analog (special) binning, 60 frame/s @1080p with V-crop
- ◆ Datarate: Max.755Mbps/lane (@4lane), 912Mbps/Lane(@2lane)

## Device Structure

- ◆ CMOS image sensor
- ◆ Image size : Diagonal 4.60mm (Type 1/4.0)
- ◆ Total number of pixels : 3296(H) x 2512(V) approx. 8.28M pixels
- ◆ Number of effective pixels : 3296(H) x 2480(V) approx. 8.17M pixels
- ◆ Number of active pixels : 3280(H) x 2464(V) approx. 8.08M pixels
- ◆ Chip size : 5.095mm (H) x 4.930mm (V) (w/ Scribe)
- ◆ Unit cell size : 1.12 $\mu$ m (H) x 1.12 $\mu$ m (V)
- ◆ Substrate material : Silicon

## Functional Description

**Block diagram**



**Exmor R**

\* Exmor R is a trademark of Sony Corporation. The Exmor R is a Sony's CMOS image sensor with significantly enhanced imaging characteristics including sensitivity and low noise by changing fundamental structure of Exmor™ pixel adopted column parallel A/D converter to back-illuminated type.

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Application circuits shown, if any, are typical examples illustrating the operation of the devices. Sony cannot assume responsibility for any problems arising out of the use of these circuits.

## FEATURES

120mA output driver with 10-bit resolution DAC  
 Smart Actuator Control (SAC<sup>TM</sup>) 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<sup>2</sup>C 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)

## APPLICATIONS

Mobile camera  
 Digital still camera  
 Camcorder  
 Web camera  
 Action camera

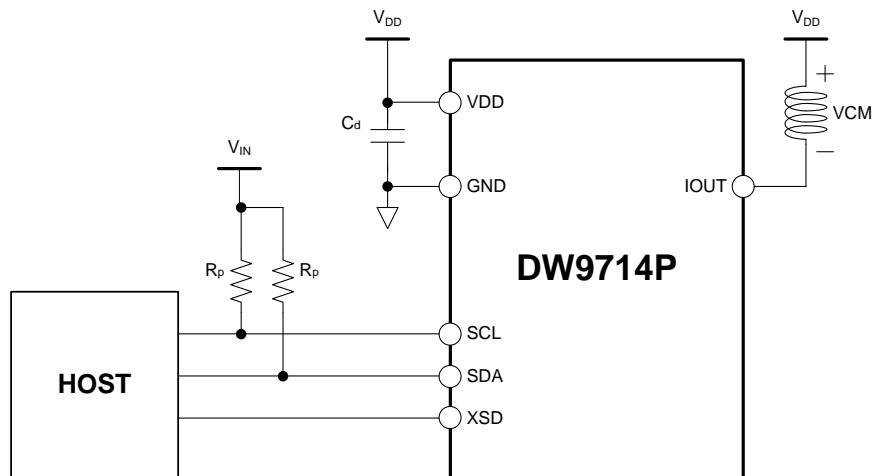
## GENERAL DESCRIPTION

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<sup>TM</sup> mode which can minimize the mechanical vibration and achieve very fast mechanical settling time. The SAC<sup>TM</sup> is protected by patent and registered trademark of DONGWOON ANATECH.

The DW9714P operates from a single 2.3V to 4.3V supply. The internal DAC is controlled via an I<sup>2</sup>C serial interface that operates at clock rate up to 1MHz. The I<sup>2</sup>C 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.

## TYPICAL APPLICATION CIRCUIT



*Figure 1. Typical application circuit*

## Cameras Applications



Automotive Driver Pilot



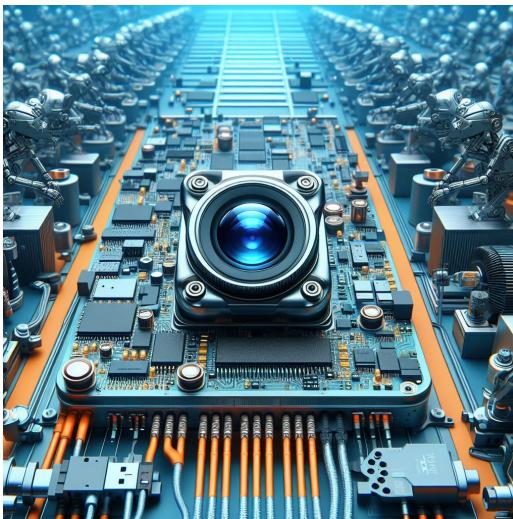
Live Streaming



Video Conference



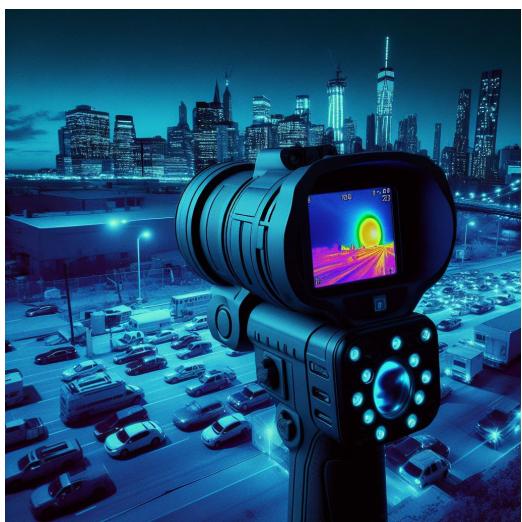
Eye Tracker Biometric Detection



Machine Vision



Agricultural Monitor



Night Vision Security



Drone and Sports Eagle Eyes



Interactive Pet Camera

## Cameras Applications



## Camera Module Pinout Definition Reference Chart

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
<b>MIPI Interface</b>	
MDN0 DN0 MD0N DATA_N DMO1N	MIPI 1st data lane negative output
MDP0 DP0 MD0P DATA_P DMO1P	MIPI 1st data lane positive output
MDN1 DN1 MD1N DATA2_N DMO2N	MIPI 2nd data lane negative output
MDP1 DP1 MD1P DATA2_P DMO2P	MIPI 2nd data lane positive output
MDN2 DN2 MD2N DATA3_N DMO3N	MIPI 3rd data lane negative output
MDP2 DP2 MD2P DATA3_P DMO3P	MIPI 3rd data lane positive output
MDN3 DN3 MD3N DATA4_N DMO4N	MIPI 4th data lane negative output
MDP3 DP3 MD3P DATA4_P DMO4P	MIPI 4th data lane positive output
MCN CLKN CLK_N DCKN	MIPI clock negative output
MCP CLKP MCP CLK_P DCKN	MIPI clock positive output
<b>DVP Parallel Interface</b>	
D0 DO0 Y0	DVP data output port 0
D1 DO1 Y1	DVP data output port 1
D2 DO2 Y2	DVP data output port 2
D3 DO3 Y3	DVP data output port 3
D4 DO4 Y4	DVP data output port 4
D5 DO5 Y5	DVP data output port 5
D6 DO6 Y6	DVP data output port 6
D7 DO7 Y7	DVP data output port 7
D8 DO8 Y8	DVP data output port 8
D9 DO9 Y9	DVP data output port 9
D10 DO10 Y10	DVP data output port 10
D11 DO11 Y11	DVP data output port 11

## 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
		Be Torn/Chopped	The Naked Eye
		Marking	The Naked Eye
	Holder	Scratches	The Naked Eye
		Gap	The Naked Eye
		Screw	The Naked Eye
		Damage	The Naked Eye
	Lens	Scratch	The Naked Eye
		Contamination	The Naked Eye
		Oil Film	The Naked Eye
		Cover Tape	The Naked Eye
Function	Image	No Communication	Test Board
		Bright Pixel	Black Board
		Dark Pixel	White board
		Blurry	The Naked Eye
		No Image	The Naked Eye
		Vertical Line	The Naked Eye
		Horizontal Line	The Naked Eye
		Light Leakage	The Naked Eye
		Blinking Image	The Naked Eye
		Bruise	Inspection Jig
		Resolution	Chart
		Color	The Naked Eye
		Noise	The Naked Eye
		Corner Dark	Less Than 100px By 100px
Dimension	Dimension	Color Resolution	The Naked Eye
		Height	The Naked Eye
		Width	The Naked Eye
		Length	The Naked Eye
		Overall	The Naked Eye

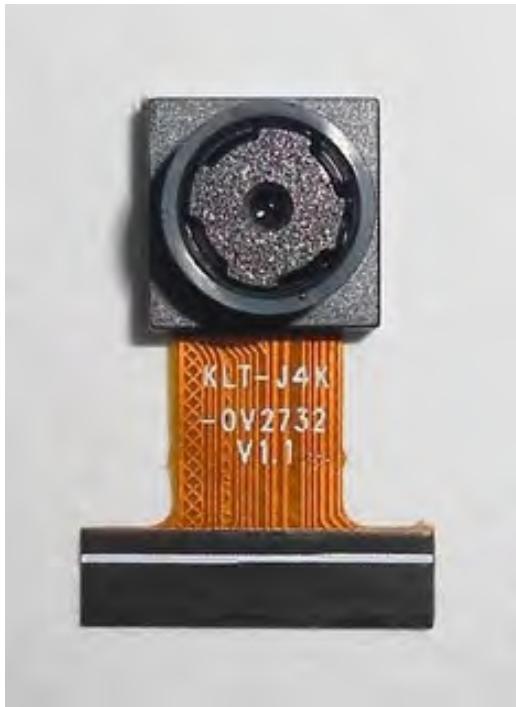


# CMOS CAMERA MODULES

your *BEST* camera module partner

## KLT Package Solutions

KLT Camera Module



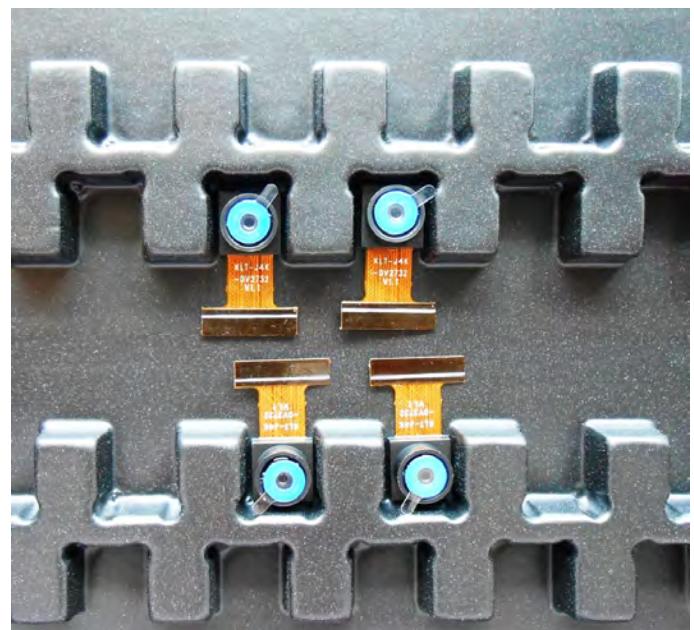
Complete with Lens Protection Film



Tray with Grid and Space

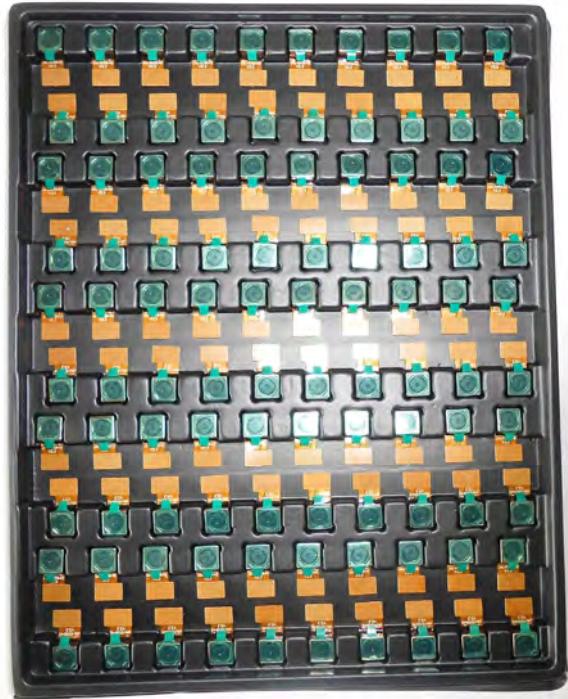


Place Cameras on the Tray



**Camera Modules Package Solution**

Full Tray of Cameras



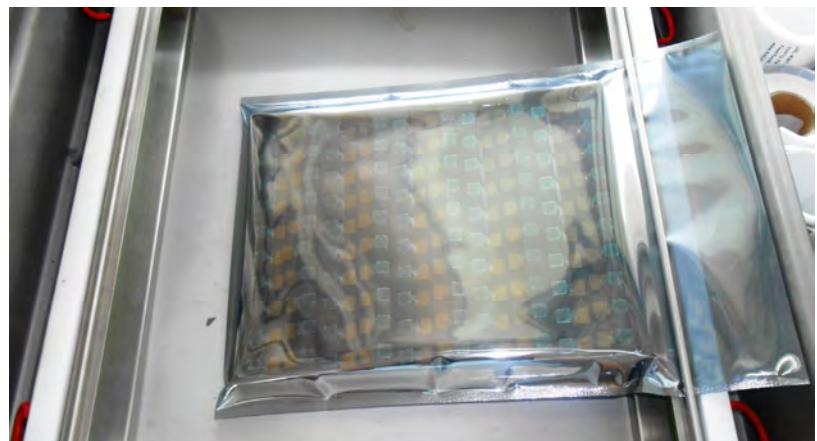
Cover Tray with Lid



Put Tray into Anti-Static Bag



Vacuum the Anti-Static Bag





# CMOS CAMERA MODULES

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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





# CMOS CAMERA MODULES

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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



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

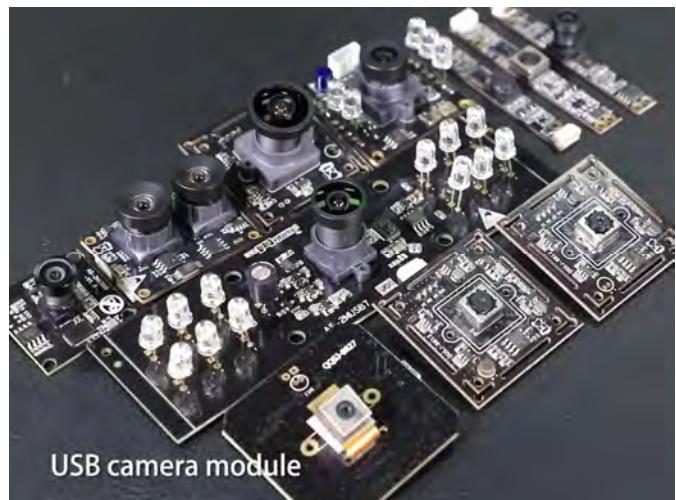


**Company Kai Lap Technologies (KLT)**

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](http://www.KaiLapTech.com). Product(s) purchased from other sellers or sources are not covered by this Limited Warranty. KLT guarantees that the Product(s) will be free from defects in materials and workmanship under normal use for a period of one (1) year from the date you receive the product ("Warranty Period").

For all Product(s) that contain or develop material defects in materials or workmanship during the Warranty Period, KLT will, at its sole option, either: (i) repair the Product(s); (ii) replace the Product(s) with a new or refurbished Product(s) (replacement Product(s) being of identical model or functional equivalent); or (iii) provide you a refund of the price you paid for the Product(s).

This Limited Warranty of KLT is solely limited to repair and/or replacement on the terms set forth above. KLT is not reliable or responsible for any subsequent events.



## KLT Strength

## Powerful Factory



## Professional Service



## Promised Delivery

