

**WDR** CMOS Image Sensor

WiDy™

# Global CMOS Image Sensor Fabless Company

**C**lairPixel, established in 2007, is a fabless semiconductor company and will be a leader in Security, Automotive and Bio-medical camera fields. We've developed a single chip 120dB WDR (Wide Dynamic Range) CMOS Image Sensor with a patented pixel architecture and a novel synthesis algorithm which does not need external frame buffer memories or back-end DSP.

## Business Scope

- Surveillance & Automotive CMOS Image Sensor  
: CCTV, IP camera, Car Black Box, Video doorphone, Automotive Rearview camera, etc.
- ALPs (Ambient Light Sensor & Proximity Sensor)
- Specialized Image Sensor (R&D and Design Service)  
: Color/NIR CIS, Color Temperature Sensor, Endoscope CIS, Thermal Imaging Sensor, etc.

## Company History

### 2013

- 5 Establish China office in Shenzhen
- 3 Developed 1/3" D1 (720x480) WDR CIS (CP8104)

### 2012

- 3 Developed 1/3" D1 (720 x 576) WDR CIS (CP5104)
- 2 Developed 1/4" VGA WDR CIS (CP5103)

### 2011

- 12 Developed ALPs (Ambient Light Sensor & Proximity Sensor, CP5301)
- 11 Invested by Corelogic Inc.  
AEC-Q100 Certification for Automotive cameras (MV5103p)
- 9 Invested by Hyundai Motor Company  
Designated as 'INNO-BIZ' company (Grade A)
- 8 Selected as Star Fab-less company by The Ministry of Knowledge & Economy

### 2010

- 12 Began to supply VGA NTSC output CIS (MV5103i) to video phone
- 8 Began to supply Lens distortion correction ASIC to Hyundai Mobis

### 2009

- 4 ISO 9001:2000 Certification
- 1 Began to supply MV5103p to Car Black Box camera, HoneyWell Korea

### 2008

- 12 Won The Prime Minister Commendation at The 9th Korea Semiconductor Design Contest
- 10 Developed the First WDR CMOS Image Sensor in Korea (MV5103)
- 9 Invested by LG Venture Investment Inc.
- 3 Registered 13 WDR CMOS Image Sensor Patents

### 2007

- 10 Certified Venture Company from Korea Venture Capital Association
- 8 Invested by Samsung Venture Investment Corp.
- 2 ClairPixel Co., Ltd. founded (spin-off from MtekVision Co., Ltd.)

# Our technology

## ClairPixel WDR CIS - WiDy™

Wide Dynamic Range (WDR) CMOS image sensor technology performs its unique ability to combine both low and high illumination in a singular image without any loss. ClairPixel's WDR image sensor has overcome the pre-existing WDR image sensors' limits and is able to produce a superior image even in various lighting situations.



Normal Sensor



WiDy™

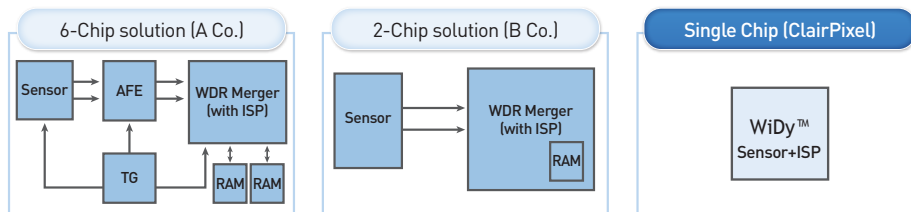


WiDy™ @ +105 °C  
(Non-WDR)



WiDy™ @ -40 °C  
(WDR)

### WDR Single Chip Solution



Other WDR sensors are multi-chip solutions that need sensor, back-end DSP and memory chip but ClairPixel's products are based on a single-chip solution.

### Application

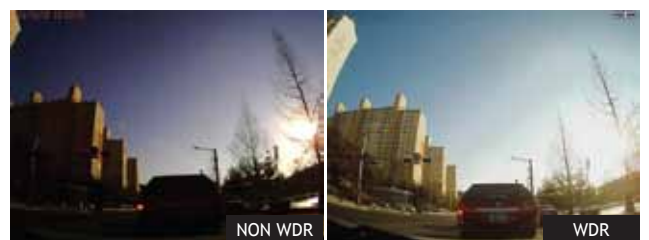


Normal vs CP8108



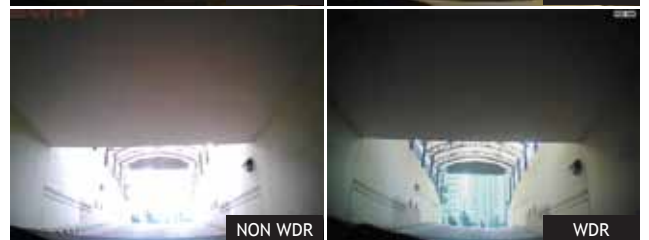
AUTOMOTIVE(Rear View)

### WDR Performance



NON WDR

WDR

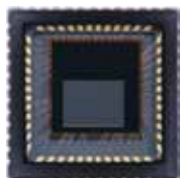


NON WDR

WDR



# Our products



## CP8108

Digital & Analog NTSC/PAL

CP8108 is a 1/3 inch single-chip WDR CMOS image sensor designed for digital automotive or surveillance camera. It enables to take a natural picture or video without any image saturation at a counter-light environment in which extremely high and low lux illumination coexists.

The image array is 720x480 pixels and capable of operating at up to 60 frames at full resolution. It enables to output various digital and analog (NTSC/PAL) formats and also be programmable through a two-wire serial interface.

Application: Security Surveillance Camera  
Door Phone  
Automotive Rearview Camera  
USB Camera

PARAMETER		TYPICAL VALUE
Optical Dimension	Optical Format	1/3 inch
	Pixel Size	6.5 $\mu\text{m}$ x 7.4 $\mu\text{m}$
	Effective Resolution	720(H) x 480(V)
	Active Pixel Area	4.732 mm(H) x 3.611 mm(V)
Digital Output		10bit, 8bit RGB Bayer, YCbCr422, RGB565/555, CCIR656
Analog Output		CVBS(NTSC/PAL) @ 54 MHz
Maximum Clock Frequency		54 MHz
Maximum Frame Rate		720x480, 30 fps @ 27 MHz (YCbCr) 720x480, 60 fps @ 54 MHz (YCbCr)
Sensitivity		6.4 V / lux·sec
Dynamic Range		120 dB
Supply Voltage	Pixel	3.3 V $\pm$ 10%
	Analog	3.3 V $\pm$ 10%
	Digital	1.5 V $\pm$ 10%
	I/O	3.3 V $\pm$ 10%
Power Consumption	Active	340 mW
Operating Temperature		-40°C to +105°C
Package Type		CLCC, PLCC



## CP5103

Digital & Analog NTSC/PAL  
1/4" VGA

CP5103 is a 1/4 inch single-chip WDR CMOS image sensor designed for analog & digital surveillance & automotive camera. It enables to take a natural picture or video without any image saturation at a counter-light environment in which extremely high and low lux illumination coexists.

The image array is 640 x 480 pixels and capable of operating at up to 60 frames at full resolution. It enables to output various analog/digital formats and also programmable through a two-wire serial interface.

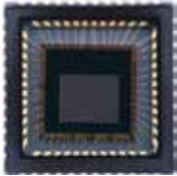
Application: Video Doorphone  
Automotive Rearview Camera  
Car Black Box

PARAMETER		TYPICAL VALUE
Optical Dimension	Optical Format	1/4 inch
	Pixel Size	5.5 $\mu\text{m}$ x 5.5 $\mu\text{m}$
	Effective Resolution	640(H) x 480(V)
	Active Pixel Area	3.56 mm(H) x 2.68 mm(V)
Digital Output		RGB Bayer, YCbCr422, RGB565, CCIR656
Analog Output		CVBS(NTSC,PAL) @ 27 MHz
Sensitivity		5.0 V / lux·sec
Maximum Frame Rate		60 fps at 27 MHz
Dynamic Range		120 dB
Supply Voltage	Pixel	3.3 V $\pm$ 10%
	Analog	3.3 V $\pm$ 10%
	Digital	1.5 V $\pm$ 10%
	I/O	3.3 V $\pm$ 10%
Power Consumption	Active	360 mW (digital)
	Active	560 mW (analog)
Operating Temperature		-30°C to +75°C
Package Type		CLCC, PLCC





# Our products



## CP5112

Digital  
1/3" 1.2Mp

CP5112 is a 1/3 inch single-chip WDR CMOS image sensor designed for digital automotive or surveillance camera. It enables to take a natural picture or video without any image saturation at a counter-light environment in which extremely high and low lux illumination coexists.

The image array is 1280 x 960 pixels and capable of operating at up to 30 frames at full resolution. It enables to output various digital formats and also be programmable through a two-wire serial interface.

- Application:
- Car Black Box
  - IP Camera
  - Machine Vision
  - USB Camera



PARAMETER		TYPICAL VALUE
Optical Dimension	Optical Format	1/3 inch
	Pixel Size	3.75 μm x 3.75 μm
	Effective Resolution	1280(H) x 960(V)
	Active Pixel Area	4.8 mm(H) x 3.6 mm(V)
Digital Output		RGB Bayer, YCbCr/YUV422, RGB565
Sensitivity		2.2 V / lux·sec
Dynamic Range		120 dB
Supply Voltage	Pixel	3.3 V ± 10%
	Analog	3.3 V ± 10%
	Digital	1.5 V ± 10%
	I/O	1.5 V or 3.3 V ± 10%
Power Consumption	Active	T.B.D
Operating Temperature		T.B.D
Package Type		CLCC



## CP5301

ALPs (Proximity Sensor & Ambient Light Sensor)

CP5301 is designed for mobile phone, notebook etc. and all-in-one sensor with ALS, PS and LED drive. CP5301 is operated by internal scheduler and I2C. This Scheduler and I2C control LED driver and ALS/PS analog, digital sleep, wake up, interrupt mode, etc. Operating voltage range is 2.4V-3.6V and it enables low power consumption by LED drive current control.

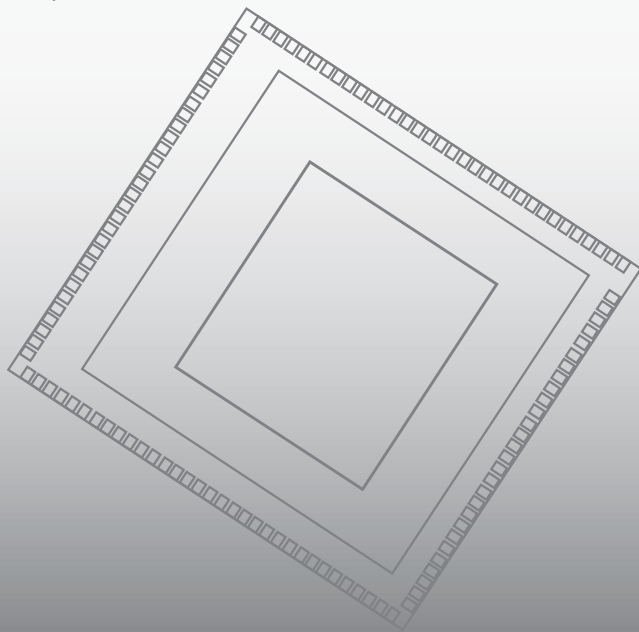
- Application:
- Industrial automation
  - Home electronics
  - PDA, GPS and mobile phones
  - Portable and Handheld devices
  - Personal Computer/Note books
  - Robot Cleaners
  - Door Lock



PARAMETER		TYPICAL VALUE
ALS	Dynamic Range	1,000,000 : 1
	ALS Count Bit Width	20 bits
	ALS Count mode	Direct update or Weighted average (1/2, 1/4, 1/8, 1/16)
	Frequency Conversion Time	100 ms
PS	Max detection distance	~100 mm
	PS Detection	Polling and Pattern Compare
	LED Current	5 mA step : 5 mA-40 mA 25 mA step : 25 mA-200 mA
	LED Pulse Width	4 μs-24 μs (1.33 μs step)
Power Consumption	Active	650 μA
	Sleep	300 μA
	Power Down	1 μA
Operating Voltage		2.4 V - 3.6 V
Operating Temperature		-30°C to +85°C
Package Dimension		4.3 mm x 2.7 mm x 1.2 mm, 8 pin

# CLAIRPIXEL

*Better than Human Eye*



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## Agent

