

深圳市优乐科技有限公司

Shenzhen you le Technology Co., Ltd.

Camera Module Specification

客 户	:	
CUSTOMER		
客 户 型 号	:	Camera
CUS' MODEL		
像素规格	:	5.0M(2592x1944-QXSGA)
PIXEL SIZE		
优乐型号	:	FD5640-500W
YL' MODEL		
日 期	:	2013-11-10
D A T E		

优乐确认			客户确认
YL' s Signature			Customer's Signature
制 作	:		
Draft			
审 核	:		
Check			
批 准	:		
Approved			

● General Description

The OV5640 CAMERACHIPTM is a low voltage CMOS image sensor that provides the full functionality of a single-chip QXSGA (2592x1944) camera and image processor in a small footprint package. The OV5640 provides full-frame, sub-sampled, scaled or windowed 8-bit images in a wide range of formats, controlled through the Serial Camera Control Bus (SCCB) interface.

This product has an image array capable of operating at up to 15 frames per second (fps) in QXSGA resolution with complete user control over image quality, formatting and output data transfer. All required image processing functions, including exposure control, gamma, white balance, color saturation, hue control, white pixel canceling, noise canceling, and more, are also programmable through the SCCB interface. The OV5640 also includes a compression engine for increased processing power. In addition, OmniVision Inc CAMERACHIPS use proprietary sensor technology to improve image quality by reducing or eliminating common lighting/electrical sources of image contamination, such as fixed pattern noise, smearing, etc., to produce a clean, fully stable color image.

The **FD5640-500W** features the OV5640 CAMERACHIP™. Refer to the OV5640_ Datasheet for chip-specific information.

● Features

- ◆ High sensitivity for low-light operation
- ◆ Low operating voltage for embedded portable apps
- ◆ Standard SCCB interface
- ◆ Output support for Raw RGB, RGB (RGB565/555), GRB422, YUV (422) and YCbCr (4:2:2) formats
- ◆ Supports image sizes: UXGA, SXGA, SVGA, and any size scaling down from CIF to 40x30
- ◆ VarioPixel® method for sub-sampling
- ◆ Automatic image control functions including Automatic Exposure Control (AEC), Automatic Gain Control (AGC), Automatic White Balance (AWB), Automatic Band Filter (ABF), and Automatic Black-Level Calibration (ABLC)
- ◆ Image quality controls including color saturation, gamma, sharpness (edge enhancement), lens correction, white pixel canceling, noise canceling, and 50/60 Hz luminance detection
- ◆ Line optical black level output capability
- ◆ Video or snapshot operation
- ◆ Zooming, panning, and windowing functions
- ◆ Internal/external frame synchronization
- ◆ Variable frame rate control
- ◆ Supports LED and flash strobe mode
- ◆ Supports scaling
- ◆ Supports compression
- ◆ Embedded microcontroller

● Applications

- Cell & Picture phones
- PC Multimedia
- Toys
- DSC

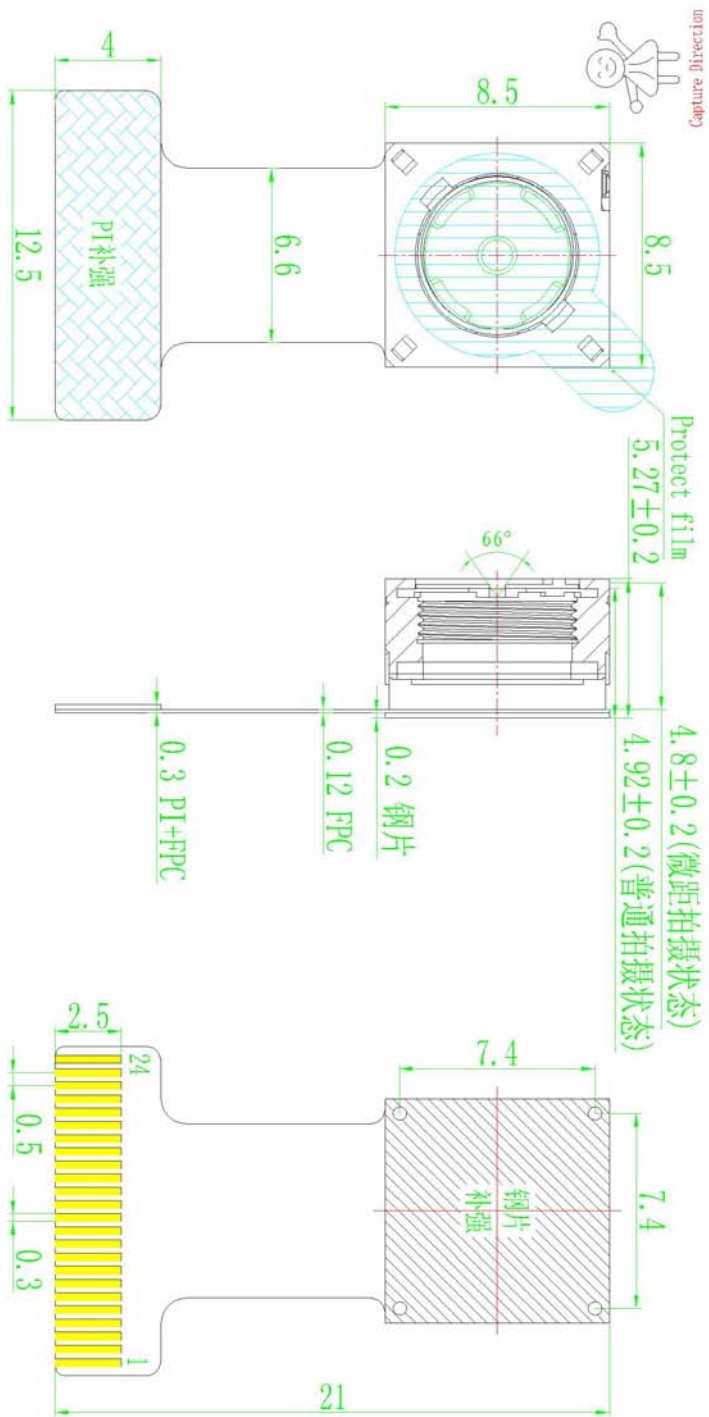
● Product Specification

Type (Array Size)	CMOS Camera Module (2592 x 1944)	
Power Supply	Core	1.5VDC + 10%
	Analog	2.8 ~ 3.0VDC
	I/O	2.8V to 3.0V
Power Requirements	Active	60 mW (for 15 fps, VGA YUV format)
	Standby	<20 μA
Temperature Range	Stable Image	0°C to 50°C
Output Format (8 Bits)	YUV(422)/YCbCr422	
	RGB565/555	
	8-bit compressed data	
	8-bit Raw RGB data	
Max. Image Transfer Rate	UXGA/SXGA	15 fps
	SVGA	30 fps
	CIF	60 fps
Sensitivity	1.3 V/Lux-sec	
Image Sensor		
S/N Ratio	46 dB	
Dynamic Range	52 dB	
Pixel Size	3.6 μm x 3.6 μm	
Image Area	2.36mm x 1.76mm	
Package Dimensions	3785um x 4235um	
Scan Mode	Progressive	
Maximum Exposure Interval	1247 x tROW	
Dark Current	12mV/s at 60°C	
Well Capacity	17 Ke	
Fixed Pattern Noise	<1% of VPEAK-TO-	

● Outline Drawing

ENV.	DATE	EC. No.	DATE	ATT. IV

BOTTOM VIEW



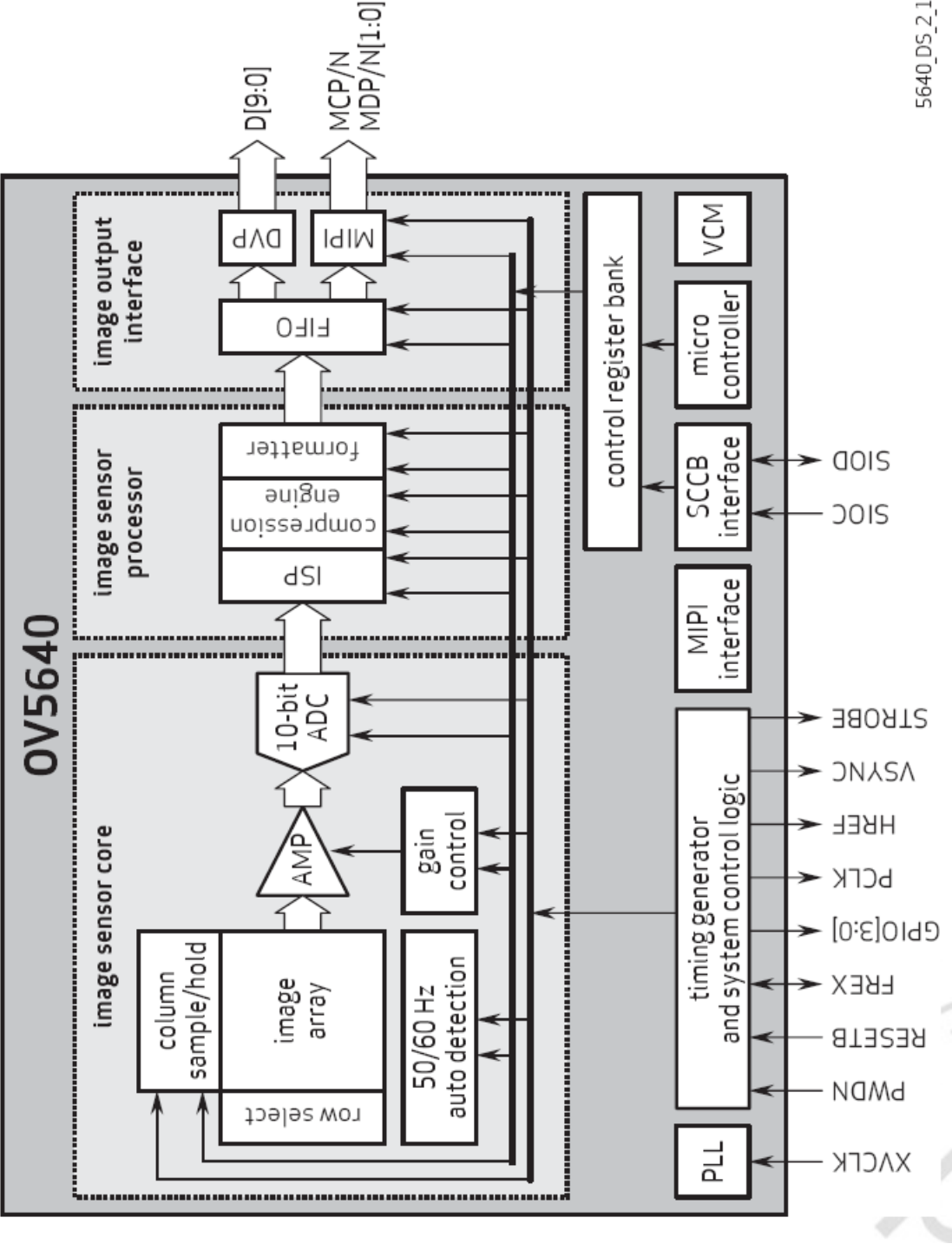
* 未注公差为: $\pm 0.1\text{mm}$

NO.	SYMBOL
1	NC
2	AGND
3	SIO-D
4	AVDD
5	SIO-C
6	RESET
7	VSYNC
8	PWDN
9	HREF
10	DVDD
11	DOVDD
12	Y9/MDP1
13	XCLK
14	Y8/MDN1
15	DGND
16	Y7/MCP
17	PCLK
18	Y6/MCN
19	Y2
20	Y5/MDP0
21	Y3
22	Y4/MDN0
23	AF-VDD
24	NC

Lens parameter		
焦距 (EFL)	2.7mm	像素 (Array Size)
光圈 (F.NO)	2.8	镜头类型 (Lens Size)
视场角 (View Angle)	66°	数字电路电压 (DVDD)
畸变 (Distortion)	< 0.4%	模拟电路电压 (AVDD)
景深 (Focusing Range)	20cm -0.6M (AT0.6M)	接口电路电压 (DVDD)
感光芯片 (Chip Type)	OV5640 SENSOR	接口电路电压 (AF-VDD)
		2.8Vto3.3V

ITEM	PART NAME	DWG NO.	QTY	UNIT/PL. MEASURE
<div style="text-align: center;"> <h1>深圳市优乐科技有限公司</h1> </div>				
TITLE :		SCALE :		
<div style="text-align: center;"> <h2>FD5640-500W</h2> </div>		1:1		
DRAWING NO. :		TYPEDRAWING :		
UNSPECIFIED DIM. : ALL DIM. 1.005 $1" = 0.051$ $1" = 0.1$ $1" = 0.5$		DIM. BY : 13 / 11 / 10 PROJECT NO. : DIM. NO. : CDR NO. :		
DIM. BY : XING 125. BY : /		REEVE ALL DIMENSIONS BREAK SHOWN DIMENSIONS 10 W/ SCALE SURF OR P/1		
ALL DIMENSIONS IN MM		A4		

● Functional Block Diagram



5640_DS_2_1

● Pin Description

Name	Type	Description	Name	Type	Description
NC	-	No connection	XCLK1	Input	System clock input
AGND	Ground	Ground for analog circuit	Y6	I/O	Video port output bit[6] Default: Input Note: There is no internal pull-up/pull-down resistor.
SIO_D	I/O	SCCB serial interface data I/O	DGND	Ground	Ground for digital video port
AVDD	Power	Power for analog circuit	Y5	I/O	Video port output bit[5] Default: Input Note: There is no internal pull-up/pull-down resistor.
SIO_C	Input	SCCB serial interface clock input Note: There is no internal pull-up/pull-down resistor.	PCLK	I/O	Pixel clock output Default: Input Note: There is no internal pull-up/pull-down resistor.
RESET	Function (Default = 0)	Clears all registers and resets them to their default values. Active low, internal pull-down resistor.	Y4	I/O	Video port output bit[4] Default: Input Note: There is no internal pull-up/pull-down resistor.
VSYNC	I/O	Vertical synchronization output Default: Input Note: There is no internal pull-up/pull-down resistor.	Y0	I/O	Video port output bit[0] Default: Input Note: There is no internal pull-up/pull-down resistor.
PWDN	Input	Power-down mode enable, active high Note: There is an internal pull-down resistor.	Y3	I/O	Video port output bit[3] Default: Input Note: There is no internal pull-up/pull-down resistor.
HREF	I/O	Horizontal reference output Default: Input Note: There is no internal pull-up/pull-down resistor.	Y1	I/O	Video port output bit[1] Default: Input Note: There is no internal pull-up/pull-down resistor.
DVDD	Power	Sensor digital power (Core)	Y2	I/O	Video port output bit[2] Default: Input Note: There is no internal pull-up/pull-down resistor.
DOVDD	Power	Power for digital video port	NC	-	No connection
Y7	I/Ot	Video port output bit[7] Default: Input Note: There is no internal pull-up/pull-down resistor.	NC	-	No connection

● Optical Specifications

Parameter	Specification	Comments
Lens Elements	3P	
Viewing Angle	66° diagonal	± 5°
EFL	3.2 mm	
F Number	2.8	± 5%
TV Distortion	± 0.24%	

● Electrical Characteristics

■ Absolute Maximum Ratings

Supply Voltages (with respect to Ground)	V _{DD-A}	4.5V
	V _{DD-C}	3V
	V _{DD-IO}	4.5 V
All Input/Output Voltages (with respect to Ground)		-0.3V to V _{DD-IO} +0.5V
Lead Temperature, Surface-mount process		245°C
ESD Rating Human Body model		2000V

NOTE: Exceeding the Absolute Maximum ratings shown above invalidates all AC and DC electrical specifications and may result in permanent device damage.

■ DC Characteristics (-30°C < T_A < 70°C)

Symbol	Parameter	Min	Typ	Max	Unit
Supply					
V _{DD-A}	Supply voltage	2.5 ^a	2.75	3.0	V
V _{DD-C}	Supply voltage	1.62	1.8	1.98	V
V _{DD-IO}	Supply voltage ^b	1.7	—	3.0	V
I _{DDA}	Active (Operating) Current ^c		10+8b		mA
I _{DDS-SCCB}	Standby Current ^d		1		mA
I _{DDS-PWDN}			10	20	uA
Digital Inputs					
V _{IH}	Input voltage HIGH	0.7x V _{DD-IO}			V
V _{IL}	Input voltage LOW			0.3x V _{DD-IO}	V
Digital Inputs					
V _{OH}	Output voltage HIGH	0.9x V _{DD-IO}			V
V _{OL}	Output voltage LOW			0.1x V _{DD-IO}	V
Serial Interface Inputs					

Note :

- If using internal regulator for DVDD, VDD-A requires greater than or equal to 2.65V
- 1.8V I/O is supported. Contact your local OmniVision FAE for further details.
- VDD-A = 2.5V, VDD-D = 1.8V, and VDD-IO = 2.5 V
- IDDS-SCCB refers to SCCB-initiated Standby, while IDDS-PWDN refers to PWDN pad-initiated Standby

■ Timing Characteristics

Symbol	Parameter	Min	Typ	Max	Unit
Oscillator and Clock Input					
fosc	Frequency (XVCLK)	10	24	48	MHZ
t _r , t _f	Clock input rise/fall time	21	42	100	ns
	Clock input duty cycle	45	50	55	%

● Reliability Test

- Refer to OV5640 date sheet. For all registerEnable/Disable bits, ENABLE = 1 and DISABLE = 0.
- The device slave addresses are 60 for write and 61 for read.

● Image Quality Specification

■ Specifications for all tests

Test Item condition \ Module Name		FD5640-500W
Resolution (ISO Chart)	Test distance	500mm
	Illumination	500Lux+/-7.5%
	Center Spec.	300
	Corner Spec.	150
Distortion		±3%
Shading		≦ 60
Color Fidelity	Block 13 ΔC	45
	Block 14 ΔC	45
	Block 15 ΔC	45
White balance	Chroma	48
	ΔC	48
Dark Noise	R	10
	G	10
	B	10

NO.	Test Items	TEST CONDITION
1	High Temperature/Humidity Storage Test	Keep in +70 °C / 95% RH duration for 96 hrs
2	Thermal Shock Test	Temperature level from -25 °C to +65 °C Each step duration for 45 min Transition : <30 sec, 60 cycles
3	Mechanical Shock Test	1. Type : semi - sinusoidal current 2. Acceleration : 500G 3. Shock duration : 1ms 4. Number of shock : 1 shock / axis 5. Test: 3 axes = 6 position (+- X, Y, Z)
4	Product Body Drop Test	1.5m / 6sides
5	ESD Test	2kv
6	Low Temperature Storage Test	Keep in -30 °C duration for 96 hrs
7	Vibration Test (Random Vibration)	3 axes, 30 minutes per axis, 0.5 Grms Frequency (Hz)P.S.D. (G2/Hz) 50.01 170.01 400.001 800.001 2000.00001

● Packaging

- ◆ Every module is placed into a tray until all empty slots of a tray are filled. Each tray contains 100 modules.
- ◆ Each tray use an anti-static bag to prevent the module from moisture by partially sucking out the air from the stack.
- ◆ A stack have ten trays.
- ◆ Insert a stack into a inner box.
- ◆ Insert two inner boxes into a outside box. Then attach the label onto the outside box.
- ◆ Insert two inner boxes into a outside box. Then attach the label onto the outside box.

● Packaging

■ Packaging Design

■ Packing q'ty: 100pcs_per tray

■ The tray dimension and material

- Top tray material: black antistatic PS , Thickness : 0.5mm
- Bottom tray material: black antistatic PS, Thickness: 0.5mm



■ layers tray per PE bag

- The PE Bag Size :350 x 186
- The Material: transparency PE bag ;Thickness : 0.1mm



■ **PE bag per partition and 12 PE bag per carton**

- The Carton size: 525 x 406 x 258
- Thickness is 7 mm, Material: B+C flute
- The long partition size 512 x 234x3.0
- The thickness: 2.7mm Material: B flute
- The Short partition size 394 x 234x3.0
- The thickness: 3.0mm Material: B flute

