

USB Camera Module Specification

5Megapixel USB2.0 OmniVision OV5640 Color CMOS Sensor USB Camera



Product Model: ELP-USB500W02M-L21

Product Name: 5MP USB Camera module

Product Specification Catalog

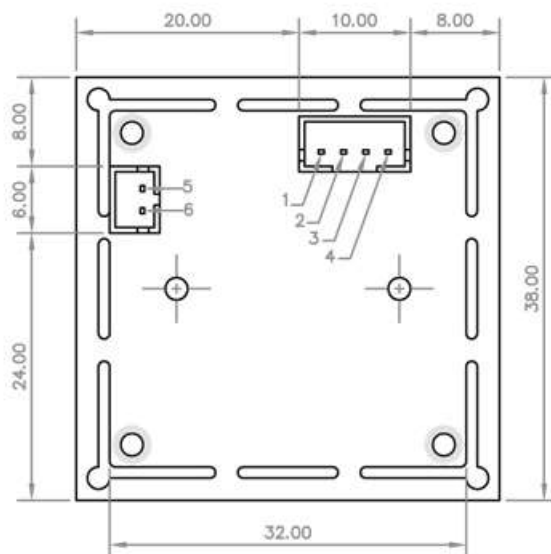
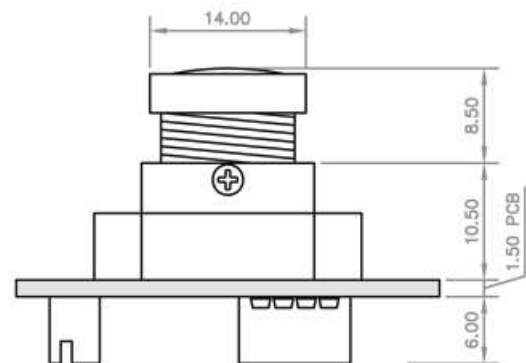
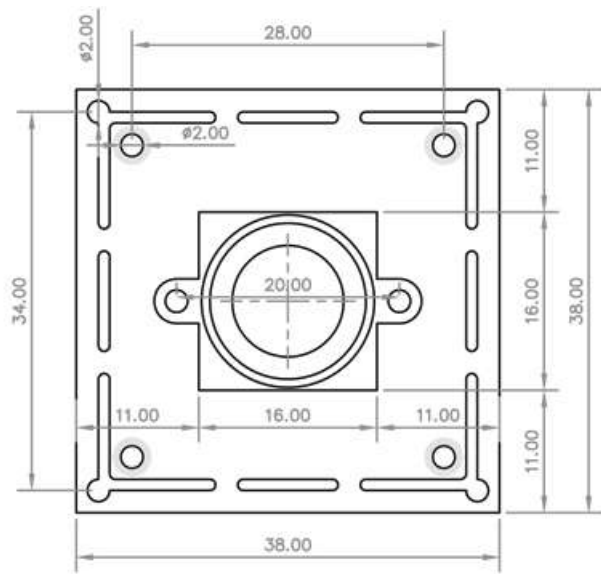
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1. Main Specifications

Module No.	ELP-USB500W02M-L21
Sensor	OV5640 (1/4inch)
Max. Resolution	2592 (H) *1944 (V)
Sensitivity	600mV/ Lux-sec
Pixel Size	1.4μm x1.4μm
Image area	3673.6μmx2738.4μm
Maximum Image Transfer Rate	2592x1944@ 15fps MJPEG / 2048x1536@ 15fps MJPEG 1600x1200@ 15fps MJPEG / 1920x1080@ 15fps MJPEG 1280x1024@15fps MJPEG/ 1280x720@ 30fps MJPEG 1024 x 768@ 30fps MJPEG/ 800 x 600@ 30fps MJPEG 640x480@ 30fps MJPEG / 320x240@ 30fps MJPEG
Camera Board Assembly technique	SMT (ROSH)
Object distance	5CM-100M
Resolution	600LW/PH (Center)
interface	USB 2.0 High Speed
protocol	USB Video Class (UVC)
S/N Ratio	36dB
Dynamic Range	68dB
Shutter	Rolling shutter/ frame exposure
Package	CSP, Bare Die
AGC/AEC/AWB/ABF	Auto
Output Formats	YUYV/MJPEG
Adjustable parameter	Brightness Contrast Hue Saturation Sharpness Gamma White Balance Exposure Focus
Package	LQFN-40pin
Lens Parameter	Standard 2.1mm, optional 2.5/2.8/3.6/6mm/FOV(D)170 Degree
LED board power connector	Support 2P-2.0mm socket
Power supply	USB BUS POWER 4P-2.0mm socket
Operating Voltage	DC5V
Power consumption	150mW (VGA) ; 200mW (QSXGA) ;
Module Size	38mm × 38mm (compatible 32X32mm)
Temperature (Operation)	-20°C to 70°C
Temperature (Stable Image)	0°C to 60°C
USB Cable	1M(2M/3M/5M Optional)
Operating system request	Win XP/Vista/Win7/Win8 / Linux with UVC (above linux-2.6.26) MAC-OS X 10.4.8 or later/Android 4.0 or above with UVC
Certifications	FCC and CE

2. Module Mechanical Dimension

Unit (mm)		
Connect 4P USB Line	1	DC5V IN
4P 2.0 Plug	2	DP
DC 5V Input	3	DM
Video output	4	GND
DC 5V output	5	GND
2P 2.0 Plug	6	DC5V OUT



3. Appearance Specification

Appearance				
No.	Item	Requirement	Test Method	Substandard Classification
1	Module Appearance	Modules surface without dirt, no visible scratches, no impurities in the holder	8X Magnifier	A
2	Lens	Under the light intensity of 800 ± 100 Lux head-down, 45-degree reflected light inspection, shall have no visible scars or dirty	8X Magnifier	A
3	PCB	1) surface without dirt, print legible; 2) Edge burr length is less than 1mm, a width of less than 0.3mm; 3) Edge gap length is less than 1mm, a width of less than 0.1mm per edge more than two	8X Magnifier	A
Appearance size				
No.	Item	Requirement	Test Method	Substandard Classification
1	High	Meet the requirements of the drawings	Digital Caliper	A
2	Length	Meet the requirements of the drawings	Digital Caliper	A
3	Width	Meet the requirements of the drawings	Digital Caliper	A

4. Image Specification

Optical performance testing requirements				
No.	Item	Requirement	Test Method	Substandard Classification
1	Dust	Under the white field, acquire images, visual screen not allowed visible foreign matter	Test fixture, Small light boxes. 6500K white backlight	A
2	Imaging Direction	Meet the requirements of the drawings	Test fixture	A
3	Dead & Wound Pixel	1) Dark field: Highlights less than 400pixel; 2 adjacent pixel cluster type highlights less than 20; no more than three pixel cluster type highlights. 2) White field: The total dark points less than 400pixel; 2 adjacent pixel cluster-type dark spots less than 20; no more than three pixel cluster type dark spots.	Test software, Small light boxes. 6500K white backlight	A
4	Resolution	5Megapixel, Center not less than 600LW / PH	MTF test program	A
5	FOV	horizontal: Vertical: Diagonal:	Test fixture, FOV target board	A
6	Shading	the center of the four corners, 90% of examination field average brightness, at least up to 45% of the center examination field, the brightness of each angle up to 35% of the center brightness (sampling frame size is 40 * 40 pixels, sensor Vignette compensation unopened).	Test software, small light boxes (3400Lux,6500K white backlight)	A
7	Color	color reproduction deviation less than 20%	Test software Color checker card	A
8	TV distortion	Pincushion distortion (positive number) or barrel distortion (negative) not more than 1%	Test software ISO12233	A
9	Grayscale	Adjacent distinguished two gray-scale brightness difference value must be less than 8	Test software, Grayscale Standard Board	A
10	CA	Less than 0.5	Test software	A

			ISO12233	
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Failure article category description:

- a) serious failure: Upon examination determined that the batch failed, or a direct impact on product quality, function, performance specifications, etc. Substandard, Indicated by the letter A;
- b) general failure: General failure means could satisfy the following conditions Substandard goods, Indicated by the letter B.
- I) does not affect the final product appearance quality;
- II) does not affect the final product technical performance;
- III) raw materials or final products does not affect the next step processing or assembly.

5. Sample Plan

No.	Test items	Sampling frequency	Test methods	Remark
Imaging and reliability program				
1	stain	Each batch N=5,C=0	Same as production	Production all-checking Program
2	Imaging direction	Each batch N=5,C=0	Test Fixture	Production all-checking Program
3	Bad points &Cluster type bad points	Each batch N=5,C=0	Same as production	Production all-checking Program
4	Resolution	Each batch N=5,C=0	MTF test program	Production all-checking Program
5	FOV	Each batch N=5,C=0	Test Fixture, FOV standard board	Sample stage full inspection assessment project QA draw-checking project
6	Image plane evenness	Each batch N=5,C=0	Test software, Small boxes (3400Lux, 6500K white backlight)	Production all-checking Program
7	Dispersion	Each batch N=5,C=0	Test software Color checker card	Sample stage full review assessment Project QA draw-checking project
8	Geometric distortion	Each batch N=5,C=0	Test software ISO12233	Sample stage full review assessment Project QA draw-checking project
9	Grayscale	Each batch N=5,C=0	Test software Grayscale Standard Board	Sample stage full review assessment Project QA draw-checking project
10	Reliability Test	Prototyping phases: sampling plan: 2PCS / each production batch, the acceptance level 0/1 Stable production phases: sampling plan: Each project 5PCS / month, acceptance level 0/1		
Appearance items				
1	Module	AQL=0.65	8X Magnifier	Production all-checking

	Appearance			Program
2	Lens	AQL=0.65	8X Magnifier	Production all-checking Program
3	PCB	AQL=0.65	45X Microscope	Production all-checking Program
4	Connector	AQL=0.65	45X Microscope	Production all-checking Program
Dimensions				
1	high	AQL=0.65	Same as production	Production all-checking Program
2	Length	AQL=0.65	Same as production	Production all-checking Program
3	Width	AQL=0.65	Same as production	Production all-checking Program

6. Reliability Specification

No.	Test items	Conditions and requirements	Test Equipment
1	Cryogenic storage	-30℃ , 96hours Heating and cooling time each 30min	Low oven
2	Low temperature operation	-30℃ , 96hours Heating and cooling time each 30min	Cryostat
3	High Temperature Storage	80℃ , 96hours Heating and cooling time each 30min	Hot box
4	High temperature operation	70℃ , 96hours Heating and cooling time each 30min	Hot box
5	High temperature and humidity storage	60℃ , 90%RH, 120hours Heating and cooling time each 30min	High temperature &Humidistat Box
6	High temperature and Humidity operation	40℃ , 90%RH, 48hours Heating and cooling time each 30min	High temperature &Humidistat Box
7	Thermal Shock Test	-30 ℃) → 80 ℃ (each 30min) high and low mutual conversion time less than 5 minutes Total: 10cycles	Low temperature box High temperature box
8	Free drop test (after packing)	height 150cm, 10 times	Oak Floor
9	Vibration test (after packing)	10Hz ~ 200Hz ~ 10Hz, the amplitude 2mm, XYZ three directions, Vibration 2 hours	Vibration test bench
10	Static test (power failure)	150Pf, 330 Euro ± 8KV, air discharge Measuring 10 times	Static tester
11	1. Product after the reliability of the tests, size, appearance, torque force, optical properties meet the product requirements. Test conditions: Illumination: small light boxes 1500 ± 10% LUX		PC Test Software MODULE Test Device



	Large light boxes $6000 \pm 10\%$ LUX Color Temperature: 4400 ± 150 K	
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7. ECO (Change History)

No.	Item	Before the change	After the change