

2. Feature

- ◆ CMOS image sensor with VGA (resolution 640X480)
Sensor Micron MI-SOC360 CMOS Sensor VGA Pixel
Pixel Resolution 640X480
Pixel Size 5.6um X5.6um
Image Size 3.58mm(H) X 2.70mm(V)

- ◆ USB 2.0 high speed interface
USB2.0 Sonix SN9C230
Transmission interface HI-SPEED USB Interface (USB2.0)
Resolution of Photograph 640 x 480 , 352 x 288 , 320 x 240 , 176 x 144 , 160 x 120
Resolution of Image 640 x 480 , 352 x 288 , 320 x 240 , 176 x 144 , 160 x 120
Frame Rate 640 x 480 @ 30 fps
Automatic White Balance Yes
Automatic Exposure Yes
Automatic Compensation Yes
Flip Control Option
Camera stats LED Option
Storage Format of Image AVI
Storage Format of Photograph BMP, JPEG

- ◆ Optical Format 1/4 inch
Optical aperture of F/2.0
Focusing range of 25 cm to Infinity
Dimension (L x W x H mm) : 89.8X 8.2X 6.3+/-0.2mm

● Major Electric Characteristics

Power Consumption 400mW (VGA@USB5.0V, 80mA)
Operating Voltage USB5.0V ± 5%

- **USB-IF Program Approve** ALLION USB 2.0 High Speed Device Test pass

3. Key Component Specification

3.1 CMOS Sensor

Parameter		Value
Optical format		1/4-inch
Active image size		3.58mm(H)X2.69mm(V) 4.48mm diagonal
Active pixels		640H X 480V
Pixel size		5.6um X 5.6um
Color filter array		RGB Bayer pattern
Shutter type		Electronic rolling shutter
Maximum data rate/ Master clock		12~13.5 MPS/24~27 MHz
Frame rate		30 fps at full resolution (640X480)
ADC resolution		10-bit,on-chip
Responsivity		1.9V/lux-sec
Dynamic range		60dB
SNR _{MAX}		45dB
Supply voltage	I/O digital	
	Core digital	
	Analog	2.8V
Power consumption		Preview mode 30 mA
Operating junction temperature		-20°C to +80°C
Image stable temperature		-20°C to +50°C
Weight		1.487 g
PCB Layer		4 Layer

3.2 DSP (Sonix SN9C230C)

3.2.1 System

- 3.3V single power supply, 1.8V Core (generated by internal regulator) and 3.3V I/O
- Extreme low power consumption, < 58mA when operation, < 38mA when standby and < 400uA when suspend (Power consumption of sensor is not included)
- Built-in PLL for internal clock generation with input crystal frequency of 12MHz
- Using external serial flash to store customized code and data
- No external RAM needed
- QFN packages of 46-pin as well as BGA is available, please see later section for more detail.

3.2.2 USB Controller

- USB 2.0 high-speed and full-speed compatible
- USB Video Class 1.1 compliant
- USB2.0 HS/FS auto sense and switch
- USB FS mode and USB disconnection are programmable
- 3 endpoints: CONTROL pipe, Interrupt IN and Isochronous-IN (video, 24MB/s max)
- 6 alternate settings for Video Streaming Interface

3.2.3 Image Pre-processing

- AE window statistics
- AWB window statistics
- AF edge statistics
- 2 Types of Y Histogram statistics
- Static defect-pixel correction (255 dots, stored in serial flash)
- On-the fly defect-pixel concealment
- Lens shading compensation for Y channel
- Individual digital color gain control for Y/Cb/Cr channel
- Pixel offset (optical black) compensation for Y channel

3.2.4 Micro Controller and USB Device Features

- Built-in 8032 micro controller with 3K bytes data memory, and maximum CPU clock rate is 24MHz
- Total 64K bytes code memory include 56K bytes mask ROM and 8K bytes SRAM
- Load extended 8KB F/W from external serial flash.
- Load VID/PID , manufacturer, product and serial number string from external serial flash.
- Load UVC parameter definition from external serial flash.
- F/W is upgradeable from PC
- Force USB at FS mode/ Force USB disconnect
- Interrupt at the end of H/W windowing
- CPU watch dog
- Abnormal voltage self-protection

3.2.5 Pre-Defined for USB Video Class

- Brightness control (UVC defined)
- Contrast control (UVC defined)
- Hue control (UVC defined)
- Saturation control (UVC defined)
- Sharpness control (UVC defined)
- Gamma control (UVC defined)
- Privacy control (UVC defined)
- Image auto-flip control triggered by GPIO
- LED indicator on video streaming
- Extension unit support

3.2.6 Platform Support

- Microsoft Windows XP 32bit SP2, Microsoft Windows XP 64bit, Microsoft Windows Vista 32bit, Microsoft Windows Vista 64bit
- Mac - OS X 10.4.8 or later
- Linux with UVC driver (open source available at <http://linux-uvc.berlios.de/>)