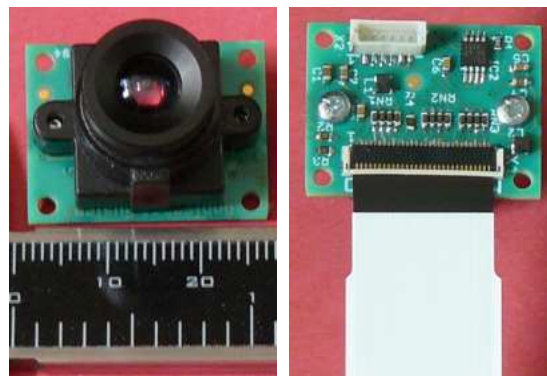


Aptina™ MT9V032 camera module

MBS032M/C

- **WVGA (752 x 480) CMOS image sensor**
- **Wide dynamic range up to 100dB**
- **Global shutter TrueSNAP™**
- **Monochrome or Color**
- **Low power, small size, low weight**
- **M12x0.5 lens mount**
- **Digital parallel interface with FFC 30 pins**



Actual size 26 x 20mm (1 x 0.8")

General description

MBS032M/C camera modules include Aptina™'s MT9V032 sensor with global shutter and high dynamic range (HDR). The sensor has specifically been designed to support the demanding interior and exterior unattended surveillance imaging needs, which makes this part ideal for a wide variety of imaging applications in real-world environments. It features DigitalClarity® CMOS imaging technology - Aptina's breakthrough low-noise CMOS imaging technology that achieves CCD image quality (based on signal-to-noise ratio and low-light sensitivity) while maintaining the inherent size, cost and integration advantages of CMOS.

MT9V032 sensor features

- Wide dynamic range
- TrueSNAP™ global shutter with simultaneous integrate and readout
- Monochrome or RGB Bayer color filters available
- Enhanced near-IR performance
- Programmable to any window size: QVGA, CIF, QCIF, etc.
- Progressive or interlaced readout modes
- 2x2 and 4x4 binning at full resolution
- Simple two-wire serial interface
- Automatic and programmable functions: regionally weighted exposure, black level offset correction, horizontal blanking, vertical blanking, lighting control, windowing, left-right and top-bottom image reversal, regional gain, image decimation, manual or automatic high dynamic.

MBS032 features

- Parallel output, power and I2C on FFC 30 pins 0.5mm pitch: DOUT<9:0>, LINE_VALID, FRAME_VALID, PIXCLK, SYSCLK, SDATA, SCLK
- Alternate signal and ground lines and series resistors on parallel output preserve signal integrity over "long" FFC.
- High retention FFC connector (FCI VLL series)
- I2C GPIO expander for sensor hardware reset, standby, and I2C address selection
- Extra wire to board connector with synchronization signals: exposure start, LED strobe output, master/slave line and frame sync.
- Single 3.3V supply.
- M12x0.5 lens mount for wide lens choice.
- **Full Video for Linux Two (V4L2) support on MBS270 XScale boards.**

Applications

- Vision guidance
- Machine vision
- Video surveillance
- Superior performance for robotics vision with instant image capture (global shutter) and ability to capture highly contrasted scenes (wide dynamic range)

Key specifications

MT9V032 Sensor

Optical format	1/3-inch
Active imager size	4.51mm(H) x 2.88mm(V) 5.35mm diagonal
Active pixels	752H x 480V
Pixel size	6.0 x 6.0µm
Color filter array	Monochrome or color RGB Bayer pattern
Shutter type	TrueSNAP™ Global shutter
Maximum data rate master clock	26.6 Mp/s 26.6 MHz
Full resolution	752 x 480
Frame rate	60 fps (at full resolution)
ADC resolution	10-bit column-parallel
Responsivity	4.8 V/lux-sec (550nm)
Dynamic range	>55dB linear; >80-100dB in HDR mode
Operating temperature	-30°C to +70°C ambient

Connectivity

FFC 30pins	Power, 10 bits parallel video data out, I2C, sensor clock
Harwin 6 pins	STLN_OUT, EXPOSURE STFRM_OUT, LED_OUT

Power

Supply	3.3V ±0.3V
Consumption	<320mW at maximum data rate
Standby	120µW

Mechanical

PCB dimensions	26 x 20mm (1 x 0.8")
Height without lens	28mm (1.1")
Weight without lens	5g
Lens weight	5-6g for most lenses

Ordering Information

on page 2

Aptina™ MT9V032 camera module

MBS032M/C

X1 connector pinout (FCI 10051922-3010ELF)

Pin	Signal name	Type	Level
1	-	No Connect ¹	-
2	SDATA	Open Drain ²	0V / 3.3V
3	SCLK	Open Drain ²	0V / 3.3V
4	GND	Power	0V
5	DOU3	Output ⁴	0V / 3.3V
6	GND	Power	0V
7	DOU5	Output ⁴	0V / 3.3V
8	GND	Power	0V
9	DOU4	Output ⁴	0V / 3.3V
10	GND	Power	0V
11	PIXCLK	Output	0V / 3.3V
12	GND	Power	0V
13	DOU7	Output ⁴	0V / 3.3V
14	LINE_VALID	Output	0V / 3.3V
15	GND	Power	0V
16	DOU0	Output ⁴	0V / 3.3V
17	GND	Power	0V
18	FRAME_VALID	Output	0V / 3.3V
19	DOU6	Output ⁴	0V / 3.3V
20	GND	Power	0V
21	SYSClk	Input ³	0V / 3.3V
22	GND	Power	0V
23	DOU2	Output ⁴	0V / 3.3V
24	GND	Power	0V
25	DOU8	Output ⁴	0V / 3.3V
26	GND	Power	0V
27	DOU1	Output ⁴	0V / 3.3V
28	GND	Power	0V
29	DOU9	Output ⁴	0V / 3.3V
30	3.3V supply	Power	3.3V

¹ When connected to MBS270, this pin level is 5V but nothing is connected to it on this module.

² When connected to MBS270, pull up resistors are provided. Pull-up resistors must be provided when connecting to alternate host.

³ There is no oscillator on-board. User must provide clock. When connected to MBS270, this pin is connected to CIF_MCLK pin.

⁴ When connected to MBS270, 8 MSBs (DOU<9:2>) are connected to CIF_DD<7:0> for 8 bits operation. DOU1 (resp. DOU0) is connected to CIF_DD9 (resp. CIF_DD8) for 10 bits operation.

X2 connector pinout (Harwin M40-3010646R)

Pin	Signal name	Type	Level
1	GND	Power	0V
2	STLN_OUT	Input/Output ¹	0V / 3.3V
3	EXPOSURE	Input	0V / 3.3V
4	STFRM_OUT	Input/Output ¹	0V / 3.3V
5	LED_OUT	Output	0V / 3.3V
6	GND	Power	0V

¹ Pin is input when MT9V032 is slave, output when master.

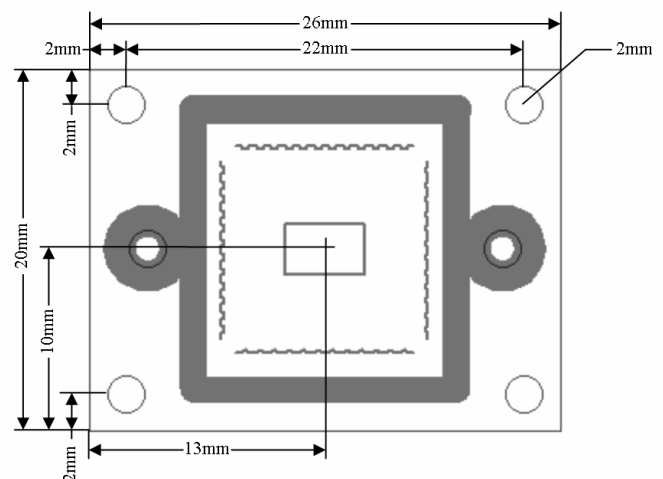
I2C 4bits GPIO expander (NXP PCA9536)

PCA9536 I2C address is 41h.

After power up, IO0-3 are inputs, host must configure them as outputs to control MT9V032 pins.

PCA9536 pin	MT9V032 pin	Function
0	S_CTRL_ADR0	MT9V032 I2C address
1	S_CTRL_ADR1	selection
2	nRESET	Active low reset
3	STANDBY	Active high standby

Mechanical drawing



Ordering information

Reference	Description
MBS032M	Camera module with MT9V032 monochrome sensor, f=6mm IR cut lens and 100mm long FFC cable.
MBS032C	Camera module with MT9V032 color sensor (Bayer pattern), f=6mm IR cut lens and 100mm (4") long FFC cable.
MBS032WK	2 receptacle housings (Harwin M40-1100600) with 6 pre-crimped contacts (Harwin M40-9000099, single ended, 150mm long)

Options	Description
-L50	50mm (2") long FFC.
-L150	150mm (6") long FFC.
-L200	200mm (8") long FFC.
-E	Enhanced version: high quality optics (industrial and scientific applications).

Append option code to product reference.

Lenses:

A wide choice of lenses is available: standard or high quality, IR-cut or IR pass, etc. Please contact us for specific needs.

contact@mobisensesystems.com