

1/2.5-Inch 5 Mp CMOS Digital Image Sensor

MT9P401 Datasheet, Rev. F

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Features

- High frame rate
- Superior low-light performance
- Low dark current
- Global reset release, which starts the exposure of all rows simultaneously
- Bulb exposure mode, for arbitrary exposure times
- Snapshot mode to take frames on demand
- Horizontal and vertical mirror image
- Column and row skip modes to reduce image size without reducing field-of-view (FOV)
- Column and row binning modes to improve image quality when resizing
- Simple two-wire serial interface
- Programmable controls: gain, frame rate, frame size, exposure
- Automatic black level calibration
- On-chip phase-locked loop (PLL)
- 720p HDTV video at 60 fps

Applications

- Digital still cameras
- Digital video cameras
- PC cameras
- Converged DSCs/camcorders
- Cellular phones
- PDAs

General Description

The ON Semiconductor MT9P401 is a 1/2.5-inch CMOS active-pixel digital image sensor with an active imaging pixel array of 2592H x 1944V. It incorporates sophisticated camera functions on-chip such as windowing, column and row skip mode, and snapshot mode. It is programmable through a simple two-wire serial interface.

The 5 Mp CMOS image sensor features ON Semiconductor'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.

Table 1: Key Performance Parameters

Parameter		Value
Optical format		1/2.5-inch (4:3)
Active imager size		5.70 mm (H) x 4.28 mm (V) 7.13 mm diagonal
Active pixels		2592H x 1944V
Pixel size		2.2 x 2.2 μm
Color filter array		RGB Bayer pattern
Shutter type		Global reset release (GRR), Snapshot only Electronic rolling shutter (ERS)
Maximum data rate/ master clock		96 Mp/s at 96 MHz (2.8V I/O) 48 Mp/s at 48 MHz (1.8V I/O)
Frame rate	Full resolution	Programmable up to 15 fps
	HDTV (1280 x 720)	Programmable up to 60 fps (with binning)
ADC resolution		12-bit, on-chip
Responsivity		1.4 V/lux-sec (550nm)
Pixel dynamic range		70.1 dB
SNR _{MAX}		38.1 dB
Supply Voltage	I/O	1.7–3.1 V
	Digital	1.7–1.9 V (1.8 V nominal)
	Analog	2.6–3.1 V (2.8 V nominal)
Power consumption		381 mW at 15 fps full resolution
Operating temperature		–30°C to +70°C
Packaging		48-pin iLCC, die

Ordering Information

Table 2: Available Part Numbers

Part Number	Product Description	Orderable Product Attribute Description
MT9P401D00C18B-N3001-200	VGA 1/3" GS CIS	Die Sales, 200µm Thickness
MT9P401I12STC-DP	5 MP 1/2.5" CIS	Dry Pack with Protective Film
MT9P401I12STC-DR	5 MP 1/2.5" CIS	Dry Pack without Protective Film