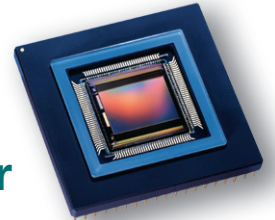MT9M413

500-fps, 1.3-Megapixel CMOS Image Sensor
Featuring Micron's TrueSNAP™ Electronic Shutter

Features

- 1,280H x 1,024V image resolution
- TrueSNAP™ freeze-frame electronic shutter
- 500 frames per second (fps)
- Monochrome or color digital output
- <500mW maximum power dissipation @ 500 fps
- On-chip, 10-bit analog-to-digital converters (ADCs)
- Simple digital interface

Description

Micron's MT9M413 is one of the industry's fastest CMOS image sensors. It features Micron's revolutionary TrueSNAP freeze-frame electronic shutter, which enables simultaneous exposure of the entire pixel array to stop even the fastest motion with crystal clear images. It delivers 10-bit color or monochrome digital images with a 1.3-megapixel resolution at 500 fps—or 655 million pixels per second—for machine vision and high-speed imaging applications. The sensor can run at higher frame rates by reducing the window size (e.g., 4,800 fps for a 1,280 x 128 pixel window). Digital responsivity of 1,600 bits per lux-second and Micron's exclusive TrueBit™ noise cancellation and TrueColor™ image fidelity ensure high image quality.

The simple digital interface provides flexibility to control exposure time, frame rate, windowing functionality, and other parameters. Compared to charged-coupled device- (CCD) based cameras, the MT9M413 is much simpler to design a camera around, and it enables a faster time-to-market with a smaller, lower-power, and higher-performance camera.

Applications

The MT9M413 CMOS image sensor captures complex high-speed events for traditional machine vision applications as well as various high-speed imaging applications. Its electronic shutter is capable of freezing and capturing near-instantaneous events with a 1.3-megapixel resolution while outputting 500 fps. The sensor can capture an event with a series of images taken at a high repetitive rate, enabling them to be viewed at lower speeds.
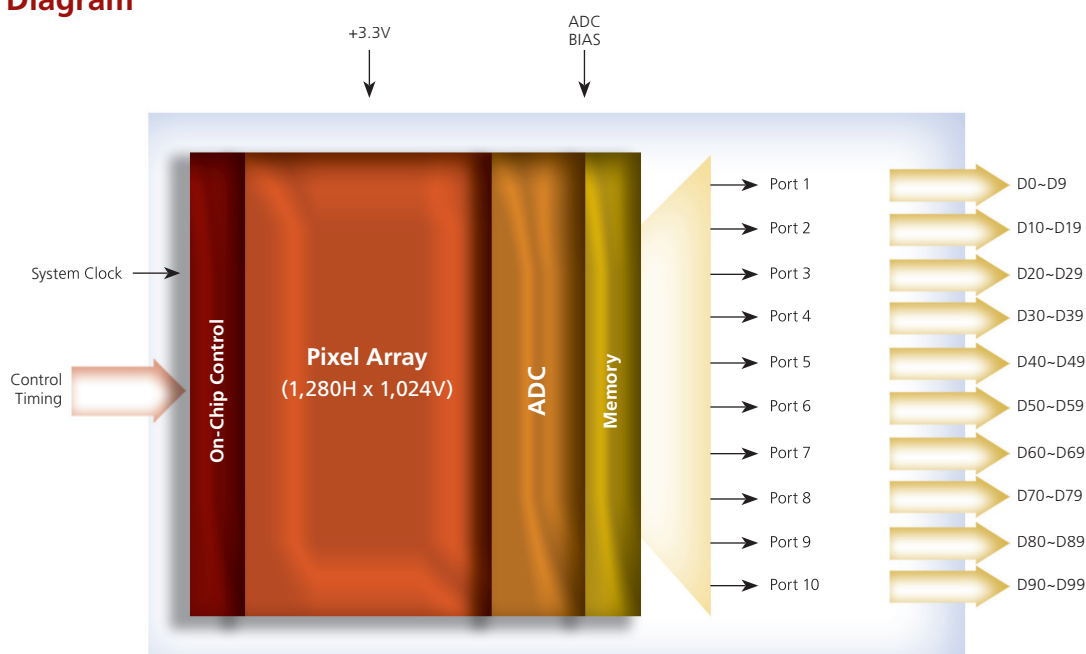
Applications include machine vision (production line monitoring and control for industries ranging from semiconductor fabrication to food sorting), automotive testing, microscopy, traffic control, 3D imaging, animation, motion analysis, film special effects, forestry, industrial and military research, and security systems. The MT9M413's capabilities enable camera performance far beyond current CCD-based systems, creating an unprecedented number of possibilities for future applications.

To learn more about Micron's imaging products, visit our Web site at *www.micron.com/imaging* or call us at 208-368-3900.

Specifications

- **Array Format:** 1,280H x 1,024V (1,310,720 pixels)

- **Aspect Ratio:** 5:4

- **Pixel Size and Type:** 12.0µm x 12.0µm TrueSNAP

- **Sensor Imaging Area:** H: 15.36mm V: 12.29mm Diagonal: 19.67mm

- **Frame Rate:** 0–500 fps @ (1,280 x 1,024) >10,000 fps with partial scan [e.g., 0–4,800 fps @ (1,280 x 128)]

- **Output Data Rate:** 660 MB/s (master clock, 66 MHz; ~500 fps)

- **Power Consumption:** <500mW (@ 500 fps)

- **Digital Responsivity:** 1,600 bits/lux-sec at 550nm

- **Internal Intra-Scene Dynamic Range:** 59dB

- **Supply Voltage:** +3.3V

- **Operating Temperature:** -5˚C to +60˚C

- **Output:** 10-bit digital video through 10 parallel ports

- **Color:** Monochrome or color RGB

- **Shutter:** TrueSNAP freeze-frame electronic shutter

- **Shutter Efficiency:** >99.9%

- **Shutter Exposure Time:** 2µs to >33ms

- **ADC:** On-chip, 10-bit column parallel

- **Package:** 280-pin ceramic PGA

- **Controls:** **On-Chip:**
  - ADC controls
  - Output multiplexing
  - ADC calibration

  Off-Chip:
  - Window size and location
  - Frame rate and data rate
  - Shutter exposure time (integration time)
  - ADC reference

Block Diagram