OS02C10

2-megapixel product brief

Image Sensor Combines Ultra Low Light and Nyxel® NIR Technologies for Industry's Best Nighttime Camera Performance

OMNIVISION's OS02C10 is a 2.9-micron, 2-megapixel image sensor with breakthrough ultra-low-light (ULL) technology. Combining ULL with OMNIVISION's industry-leading Nyxel® near-infrared (NIR) technology, the OS02C10 works equally well in all lighting conditions. It can detect incident light in both visible and NIR wavelengths and produce precise color and monochrome images for security applications such as remote surveillance cameras with AI for accurate facial recognition.

Nyxel® NIR technology infuses the OS02C10 with exceptional quantum efficiency (QE) of 60% at 850 nm and 40% at 940 nm, which is 2x to 4x better than competing devices. This enables the use of lower-power IR illumination in total darkness, resulting in an estimated 3x reduction in system-level power consumption. Additionally, 940 nm NIR lighting cannot be detected by the human eye in dark indoor settings, while 850 nm light is ideal for outdoor security cameras. The OS02C10's ability to capture crisp, clear images using undetectable 940 nm NIR light means that indoor security cameras will not disturb sleeping occupants, and can be easily concealed from intruders.

The amount of NIR light that a sensor requires to capture high-quality images can be quantified with a new metric called NIR SNR1, which takes into account the QE, pixel size and read noise. The OC02C10 achieves an $SNR1_{850nm}$ of 23 nW/cm² and an $SNR1_{940nm}$ of 31 nW/cm², which means designers can reduce IR illumination to consume 2x to 4x less power compared to the competitors' sensors, for the same environment and over the same image-detection range.

The OC02C10 has a superior low-noise design, achieving an SNR1 of 0.16 lux while producing high definition 1080p images. OMNIVISION's proprietary dual conversion gain (DCG™) technology allows this sensor to achieve the industry's best ULL performance, while the 3-frame staggered shutter minimizes motion artifacts and enables a high dynamic range (HDR) of 120 dB. Additionally, these technologies are easily upgradable to 2K and 4K resolution as security systems begin their transition to higher-quality displays.

Find out more at www.ovt.com.

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Ordering Information

- **OS02C10-A59A-1B** (color, lead-free)
  59-pin CSP, rev 1B

Applications

- security cameras
- action cameras
- high resolution consumer cameras

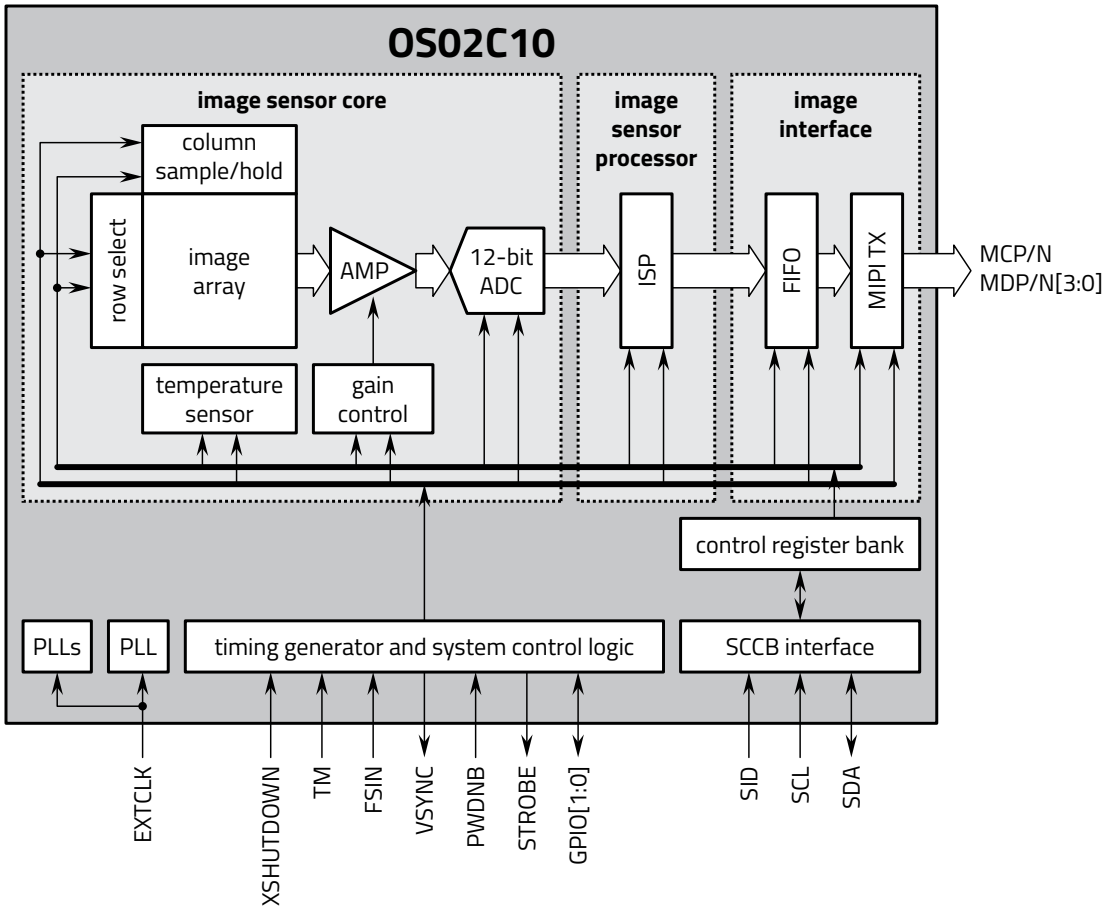
Product Features

- QE enhancement in NIR range
- support for image size:
  - 1920 x 1080
  - VGA
  - QVGA, and any cropped size
- high dynamic range
- high sensitivity
- image sensor processor functions:
  - defective pixel cancelation
  - DCG™ combination
  - automatic black level correction
  - PWL compression, etc.
- pixel data: 12b RAW RGB
- SCCB for register programming
- programmable GPIOs
- high speed serial data transfer with MIPI CSI-2 or LVDS
- external frame synchronization capability
- embedded temperature sensor
- one time programmable (OTP) memory

Technical Specifications

- **active array size:** 1920 x 1080
- **maximum image transfer rate:**
  - 40X3 fps @ 1080p in 10-bit
  - 30X3 fps @ 1080p in 12-bit
- **power supply:**
  - analog: 2.8V
  - digital: 1.1V
  - I/O pins: 1.8V
- **temperature range:**
  - operating: -30°C to +85°C junction temperature
- **output interfaces:**
  up to 4-lane MIPI CSI-2 or LVDS
- **lens size:** 1/2.8"
- **lens chief ray angle:** 9° linear
- **output formats:** single exposure HDR - 16-bit combined RAW, 12-bit (PWL) compressed combined RAW; dual exposure HDR - 16-bit combined RAW + 12-bit VS RAW, 12-bit (PWL) compressed combined RAW + 12-bit VS RAW; 3-exposure HDR - 12-bit long exposure + 12-bit medium exposure + 12-bit short exposure
- **scan mode:** progressive
- **shutter:** rolling shutter
- **pixel size:** 2.9 µm x 2.9 µm
- **image area:** 5614.4 µm x 3178.4 µm

Functional Block Diagram



Version 1.5, June 2024

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