



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 OS02C10 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 OS02C10 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 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.



- OS02C10-J70A-Z (color, lead-free)
70-pin fan-out package

Applications

- security cameras
- high resolution consumer cameras
- action cameras

Product Features

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

Technical Specifications

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

Functional Block Diagram

