

## SNAPSHOT RGB-NIR MULTISPECTRAL IMAGE SENSOR

Imec's RGB-NIR multispectral platform demonstrates, for the very first time, the possibility to integrate standard RGB organic color filters, a NIR-cut filter, NIR narrow band-pass filters and on-chip microlenses technology, down to pixels as small as  $5\mu\text{m}$ . First prototypes of this image sensor are now available, packaged in a ready-to-use CMV2000 image sensor standard format for easy integration and early evaluation into final applications.

### SNAPSHOT RGB+NIR, A BREAKTHROUGH IN MULTI-SPECTRAL IMAGE SENSING

The integration of per-pixel patternable narrow-band NIR imaging filters with a NIR-cut filter for true color rendering based on standard RGB organic color filter and microlens array technology is a major integration breakthrough.

Specialists identify this technology as a key enabler for next-generation human-machine 3D imaging and medical diagnosis. But also in automotive and security surveillance applications where various NIR lighting concepts (LED or laser based) are explored to improve the detection or tracking of useful signals which are purposely not visible to the human eye.

Imec designs and manufactures high-quality interference-based optical filters. These are deposited and patterned directly on top of CMOS image sensor pixel arrays, on the level of the wafers. The technology leverages standard CMOS fabs, equipment and process technology. This unique infrastructure provides very clean (class 1 – particle free) optical filter integration with unprecedented size and cost reduction, with potential for high-volume manufacturing.

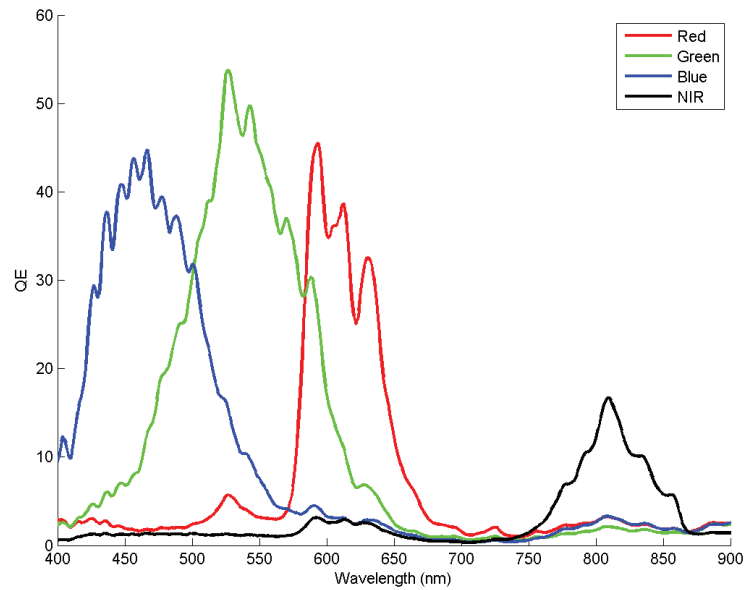
### KEY BENEFITS

- **Color + narrow-band NIR imaging** integrated into a single chip for compact, low cost and integrated optical design solutions
- **Turnable NIR band-pass filter design to match filter band** (location, FWHM) with your own application requirements, for use e.g. with a particular laser or LED wavelength.

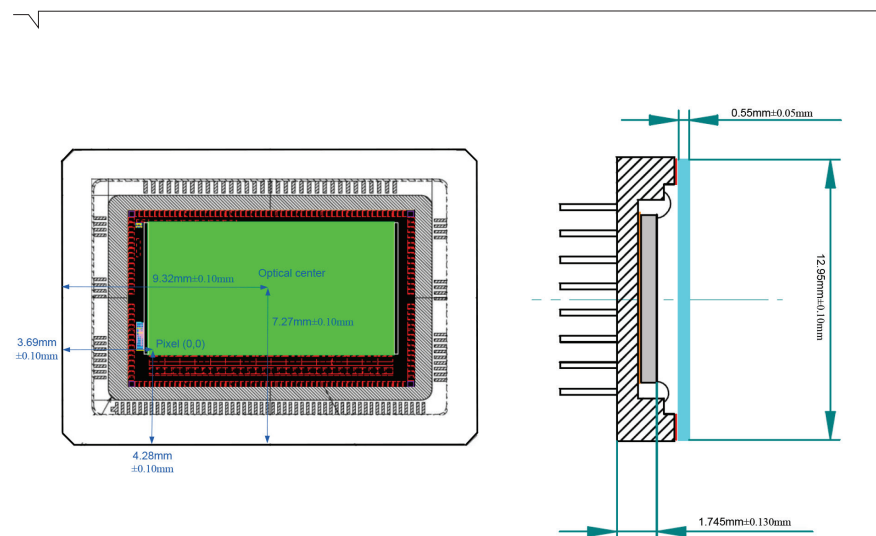
## RGB+NIR MULTISPECTRAL IMAGE SENSOR SPECIFICATIONS

Resolution	2048x1088
Pixel size	5.5x5.5um
Full well charge	13.5 Ke-
Conversion gain	0.075 LSB/e-
Sensitivity	4.64 V/lux.s
Temporal noise	13 e- (RMS)
Dynamic range	60 dB
Optical format	1"
Parasitic light sensitivity	< 1/50 000
Dark current	125 LSB/s (@25°C)
Operating temperature	-30°C to +70°C
Power consumption	600mW
Speed	340fps
Fixed pattern noise	<1 LSB

CMV2000 image sensor performance



Measured QE responses of RGB+NIR spectral channels(with microlenses array post-processed on top of each filter)



RGB-NIR spectral imager package pin-out configuration

## POTENTIAL APPLICATIONS

- Medical imaging using ICG fluorescence
- Human-machine interface for 3D gaming & virtual reality tracking
- Automotive
- Security surveillance
- Industrial inspection
- Food sorting

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