

# Sci-CMOS 2020/2011

## 4MP/ 2MP Scientific Image Sensor for High Speed Imaging

Preliminary Short Form Datasheet



### Sensor descriptions:

Sci-CMOS 2020/2011 is a 4 MP/2 MP scientific CMOS image sensor, capable of running in either global or rolling shutter mode. Featured with 5 Transistor (5T) pixel design on a 6.5  $\mu\text{m}$  pitch, the devices have ultra-low readout noise of 2  $e^-$  in rolling shutter mode, and 6  $e^-$  in global shutter mode. The peak quantum efficiency is up to 62 % for both sensors. To further increase the sensitivity for low light level imaging, the devices support on-chip 2 x 2 binning. In addition, Sci-CMOS 2020/2011 can be operated in standard 12 bit mode with 70 dB intra-scene dynamic range or in HDR mode with more than 88 dB dynamic range.

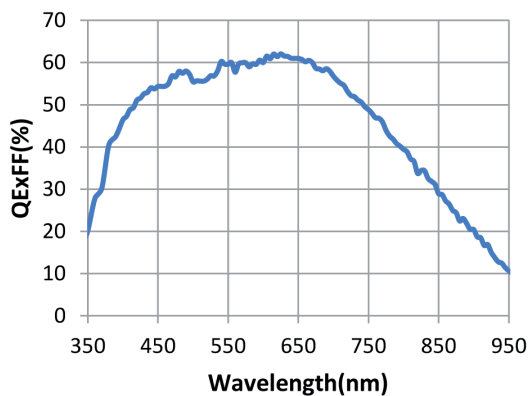
High frame rate is another important feature: Sci-CMOS 2020's frame rate is up to 94 fps in rolling shutter mode, and up to 376 fps in 10 bit global shutter mode. The frame rate nearly doubles for Sci-CMOS 2011. Sci-CMOS 2020/2011 is housed in pin-compatible ceramic PGA packages with open area on the bottom side, making TEC cooling possible. These features make Sci-CMOS 2020/2011 an ideal imager for various application, including cooled scientific imaging, high speed imaging, machine vision, and high-end surveillance applications.

### Sensor features:

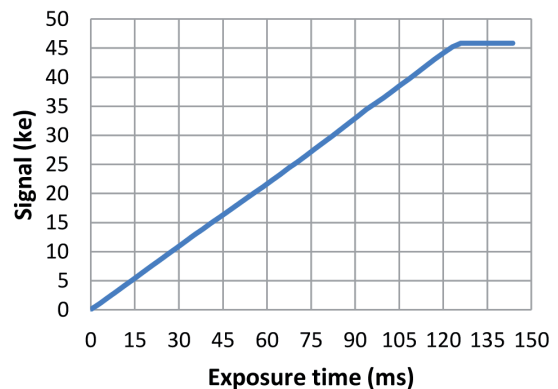
- Pixel resolution of 2048 x 2048 / 2048 x 1152
- 6.5  $\mu\text{m}$  x 6.5  $\mu\text{m}$  pixel size
- Optical format of 1.2" / 1"
- Rolling and global shutter selectable
- < 2  $e^-$  RMS dark noise in rolling shutter
- < 6  $e^-$  noise in global shutter with external CDS
- Dynamic range of 88 dB @ HDR Rolling
- Dynamic range of > 70 dB @ HDR Global
- Frame rate for Sci-CMOS 2020
  - 376 fps @ 10 bit global
  - 94 fps @ HDR global with external CDS
  - 94 fps @ rolling
  - 47 fps @ HDR rolling
- Frame rate for Sci-CMOS 2011
  - 668 fps @ 10 bit global
  - 167 fps @ HDR global with external CDS
  - 167 fps @ rolling
  - 83 fps @ HDR rolling
- Row-based ROI windowing capability with enhanced frame rate
- PRNU < 1 %, FPN < 0.1 %
- Non-linearity < 0.5 %
- On-chip temperature sensor, PLL and SPI

<b>Sensor Specifications:</b>			
Optical format	1.2" / 1"	Full well charge	> 48 ke <sup>-</sup>
Pixel size	6.5 μm × 6.5 μm	SNR Max	46 dB
Resolution	2048 × 2048 / 2048 × 1152	Dark noise (Rolling)	< 2 e <sup>-</sup>
Shutter type	Rolling & Global shutter	Dark noise (Global)	< 6 e <sup>-</sup>
ADC	2 x 12 bit @ rolling 2 x 10 bit @ global	Dynamic range	> 88 dB (HDR in rolling) > 70 dB (HDR in global)
Output interface	16 x 2 LVDS @ global 4 x 2 LVDS @ rolling	Quantum efficiency	62 % @ 550 nm
PRNU	< 1 %	Dark current	< 1 e <sup>-</sup> /p/s @ 0 °C
Supply voltage	3.3 V / 1.8 V	Operating	- 55 °C ~ + 85 °C
Power consumption	< 0.8 W @ rolling < 1.5 W @ global	Package	152 pins PGA

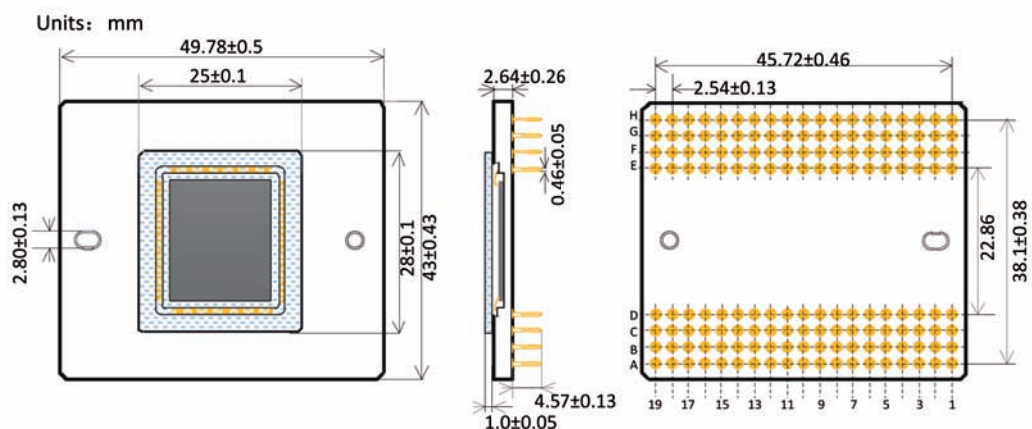
**QExFF:**



**Response curve:**



**Package:**



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**ANDANTA** GmbH Detektortechnologie  
Ilzweg 7+9 • 82140 Olching/Deutschland  
Tel: +49 8142 41058-0 • Fax: +49 8142 41058-29  
e-mail: epost@andanta.de • www.andanta.de