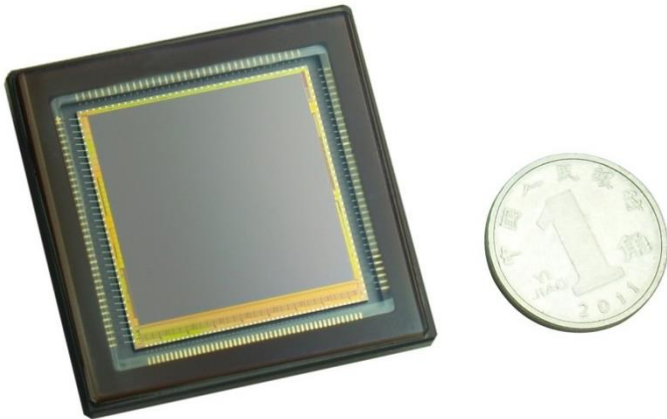


## CMOS Image Sensor for Scientific Applications – GSENSE400



- Dark noise:  $1.47 e^-$
- Sensitivity:  $1.81 \times 10^8 e^- / ((W/m^2) \cdot s)$
- Dynamic range: >96dB
- STD mode and HDR mode

### SENSOR DESCRIPTION

The GSENSE400 is a 4 Megapixels CMOS image sensor with  $11\mu m$  patented pinned photodiode pixels and electronic rolling shutter. Designed for scientific and high-end surveillance applications, GSENSE400 features low readout noise of 1.47 electrons, dynamic range of 96dB and sensitivity of  $1.81 \times 10^8 e^- / ((W/m^2) \cdot s) @ 600nm$

GSENSE400 can be either operated in standard mode (STD) with 70dB intra-scene dynamic range, or in high dynamic range mode (HDR) with 96dB intra-scene dynamic range. GSENSE400 is capable of running up to 48fps in STD mode, or 24fps in HDR mode, and higher frame rates can be achieved in row-windowing mode.

Mounted in a 115-pin ceramic PGA package, the power consumption of less than 600mW can be easily dissipated. In addition, GSENSE400 has a dark current of less than  $0.15 e^- / s / pix$  at minus  $20^\circ C$ , making it an ideal solution for the most demanding bio-imaging applications with long exposure time.

### SENSOR FEATURES

- Pixel Resolution: 2048(H) x 2048(V)
- $11\mu m$  patented pinned photodiode pixel
- Optical and electrical black pixel rows
- Electronic rolling shutter
- Sensitivity:  $1.81 \times 10^8 e^- / ((W/m^2) \cdot s) @ 600nm$
- Dark noise:  $1.47 e^-$
- Dynamic range:
  - STD mode: 68dB (intra-scene)
  - HDR mode: 96dB (intra-scene)
- Dark current :  $< 0.15 e^- / s / pix @ -20^\circ C$
- 48fps in STD mode
- 24fps in HDR mode
- Row-based ROI windowing capability with enhanced frame rate
- PRNU:  $< 0.8\%$
- FPN:  $< 2 e^-$
- On-chip temperature sensor
- On-chip SPI control and on-chip PLL
- Power consumption  $< 600mW$

## SENSOR SPECIFICATIONS

Photon-sensitive area	22.5mm(H) x 22.5mm(V)	SNR Max	>49dB
Pixel size	11 $\mu$ m x 11 $\mu$ m	Dark noise	1.47e <sup>-</sup>
Resolution	2048 x 2048	Dark current	<0.15e <sup>-</sup> /s/pix @ -20 $^{\circ}$ C
Shutter type	Electronic rolling shutter	Dynamic range(STD mode)	>68dB(intra-scene)
ADC	12bit	Dynamic range (HDR mode)	>96dB(intra-scene)
Main clock rate	20MHz ~ 30MHz	Sensitivity(600nm)	1.81 x 10 <sup>8</sup> e <sup>-</sup> /((W/m <sup>2</sup> )·s)
Max frame rate	48fps	Full well charge	91ke <sup>-</sup>
Data rate	2.4Gbit/s @ 25MHz	FPN	<2e <sup>-</sup>
Supply voltage	3.3V / 1.8V	PRNU	<0.8%
Operating temperature	-55 $^{\circ}$ C ~ +80 $^{\circ}$ C	QExFF (no $\mu$ lens)	58% @ 600nm
Max power	<600mW	Package	115-pin PGA

