

NOIP1SN5000A, NOIP1SN2000A

PYTHON 5.0/2.0 MegaPixels Global Shutter CMOS Image Sensors



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Features

- 5 MegaPixels: 2592 x 2048 Active Pixels
2 MegaPixels: 1920 x 1200 Active Pixels
- 4.8 μm x 4.8 μm Low Noise Global Shutter Pixels with In-pixel CDS
- Monochrome (SN), Color (SE) and NIR (FN)
- Zero ROT Mode Enabling Faster Frame Rate
- Frame Rate at Full Resolution (LVDS)
 - ◆ 100/85 frames per second @ 5 MP (Zero ROT/Normal ROT)
 - ◆ 230/180 frames per second @ 2 MP (Zero ROT/Normal ROT)
- On-chip 10-bit Analog-to-Digital Converter (ADC)
- 8-bit or 10-bit Output Mode
- Eight Low Voltage Differential Signaling (LVDS) High Speed Serial Outputs
- Random Programmable Region of Interest (ROI) Readout
- Pipelined and Triggered Global Shutter
- LVDS Channel Multiplexing
- On-chip Fixed Pattern Noise (FPN) Correction
- Serial Peripheral Interface (SPI)
- Automatic Exposure Control (AEC)
- Phase Locked Loop (PLL)
- High Dynamic Range (HDR)
- Dual Power Supply (3.3 V and 1.8 V)
- -40°C to +85°C Operational Temperature Range
- 84-pin LCC and Bare Die
- 1220 mW Power Dissipation
- These Devices are Pb-Free and are RoHS Compliant

Applications

- Machine Vision
- Motion Monitoring
- Security
- Intelligent Traffic Systems (ITS)

Description

The PYTHON's high sensitivity 4.8 μm x 4.8 μm pixels support low noise "pipelined" and "triggered" global shutter readout modes. In global shutter mode, the sensor supports correlated double sampling (CDS) readout, reducing noise and increasing dynamic range.

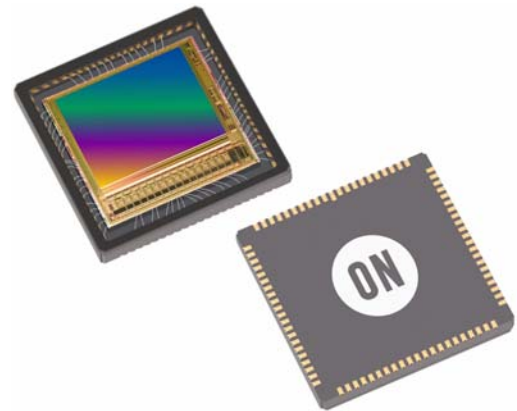


Figure 1. PYTHON 5 MegaPixel

The sensor has on-chip programmable gain amplifiers and 10-bit A/D converters. The integration time and gain parameters can be reconfigured without any visible image artifact. Optionally the on-chip automatic exposure control loop (AEC) controls these parameters dynamically. The image's black level is either calibrated automatically or can be adjusted by adding a user programmable offset.

A high level of programmability using a four wire serial peripheral interface enables the user to read out specific regions of interest. Up to eight regions can be programmed, achieving even higher frame rates.

The image data interface part consists of eight LVDS lanes, facilitating frame rates up to 100 frames per second in Zero ROT mode. Each channel runs at 720 Mbps. A separate synchronization channel containing payload information is provided to facilitate the image reconstruction at the receiving end.

The PYTHON medium resolution family is packaged in a 84-pin LCC package and is available in a monochrome and color version. For more information, please contact your local distributor or email us at imagesensors@onsemi.com.

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SPECIFICATIONS

Key Specifications

Table 1. GENERAL SPECIFICATIONS

Parameter	Specification
Pixel Type	Global shutter pixel architecture
Shutter Type	Pipelined and triggered global shutter
Frame Rate at Full Resolution	100 frames per second @ 5 MegaPixels 230 frames per second @ 2 MegaPixels
Master Clock	72 MHz when PLL is used, 360 MHz (10-bit) / 288 MHz (8-bit) when PLL is not used
Windowing	8 Randomly programmable windows. Normal, sub-sampled and binned readout modes
ADC Resolution (Note 1)	10-bit, 8-bit
LVDS Outputs	8 data + sync + clock
Data Rate	8 x 720 Mbps (10-bit) / 8 x 576 Mbps (8-bit)
Power Dissipation	1220 mW in 10-bit mode
Package Type	84-pin LCC

1. The ADC is 11-bit, down-scaled to 10-bit. The PYTHON uses a larger word-length internally to provide 10-bit on the output.

Table 2. ELECTRO-OPTICAL SPECIFICATIONS


Parameter	Specification
Active Pixels	5 MegaPixels: 2592 (H) x 2048 (V) 2 MegaPixels: 1984 (H) x 1264 (V)
Pixel Size	4.8 μm x 4.8 μm
Conversion Gain	0.103 LSB 10 /e $^{-}$ · 139 $\mu\text{V}/\text{e}^{-}$
Temporal Noise	< 9e $^{-}$ (Normal ROT, 1x gain) < 7e $^{-}$ (Normal ROT, 2x gain)
Responsivity at 550 nm	7.7 V/lux.s
Parasitic Light Sensitivity (PLS)	<1/8000
Full Well Charge	10000 e $^{-}$
Quantum Efficiency (QE x FF)	56%
Pixel FPN	< 0.5 LSB 10
PRNU	< 10 LSB 10
MTF	68% @ 535 nm - X-dir & Y-dir
PSNL @ 20°C (t $_{\text{int}}$ = 30 ms)	120 LSB 10 /s, 1200 e $^{-}$ /s
Dark Signal @ 20°C	5 e $^{-}$ /s, 0.5 LSB 10 /s
Dynamic Range	> 60 dB in global shutter mode
Signal to Noise Ratio (SNR max)	40 dB

To receive a detailed product data sheet and supporting documentation, visit the CISP Extranet at www.onsemi.com/MyON.

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