NOIV1SN016KA, NOIV1SN012KA

Advance Information
VITA 16 MP, VITA 12 MP Single Foot Print CMOS Image Sensor

ON Semiconductor®

Features

- Active Pixel Array:
  - VITA 12MP: 4096 × 3072 Active Pixels
  - VITA 16MP: 4096 × 4096 Active Pixels
- Optical Format:
  - VITA 12MP: 4/3 inch Optical Format
  - VITA 16MP: 35 mm Optical Format
- 4.5 μm × 4.5 μm Square Pixels
- 32/16 Low-Voltage Differential Signaling (LVDS) High-speed Serial Outputs
- VITA 12MP Frame Rate at Full Resolution, 32 LVDS Outputs
  - 110 Frames per Second normal ROT
  - 160 Frames per Second Zero ROT
- VITA 16MP Frame Rate at Full Resolution, 32 LVDS Outputs
  - 80 Frames per Second normal ROT
  - 125 Frames per Second Zero ROT
- Monochrome (SN), Color (SE)
- On-chip 10-bit Analog-to-Digital Converter (ADC)
- 8-bit or 10-bit Output Mode
- 32 Random Programmable Region of Interest (ROI) readout
- Pipelined and Triggered Global Shutter, Rolling Shutter
- Serial Peripheral Interface (SPI)
- Operational Temperature Range: -40°C to +85°C
- Single 355−pin μPGA Package across Resolutions
- Power Dissipation: 4.2 W @ 2 Gpix/s
- These Devices are Pb−Free and are RoHS Compliant

Figure 1. VITA 12MP/16MP Photograph

This document contains information on a new product. Specifications and information herein are subject to change without notice.

Applications

- Machine Vision
- Motion Monitoring
- Intelligent Traffic Systems (ITS)
- Pick and Place Machines
- Inspection
- Metrology

Description

VITA 12MP and VITA 16MP extend the VITA family of CMOS image sensors supporting both global and rolling shutter imaging. The on-chip programmable state machine controls the sensor array of 4096 x 4096 pixels (VITA 16MP) or 4096 x 3072 (VITA 12MP), enabling high flexibility with changes in operation modes and 32 frame-to-frame configurable Regions-of-Interest (ROI). The 5T pixel on a 4.5 μm pitch enables pipelining of integration and read-out in both triggered and un-triggered global shutter mode. The roller shutter mode supports correlated double sampling, reducing temporal noise by approximately 3 dB. The sensor has on-chip programmable gain amplifiers and 10-bit A/D converters. The image's black level has an automatic calibration with adjustable user programmable offset. The image data interface consists of 32 or 16 LVDS channels with additional clock and synchronization channels in parallel, each running at 680 Mbps. In order to ease camera support across multiple resolutions, the VITA 12MP, VITA 16MP and VITA 25MP are pin compatible.
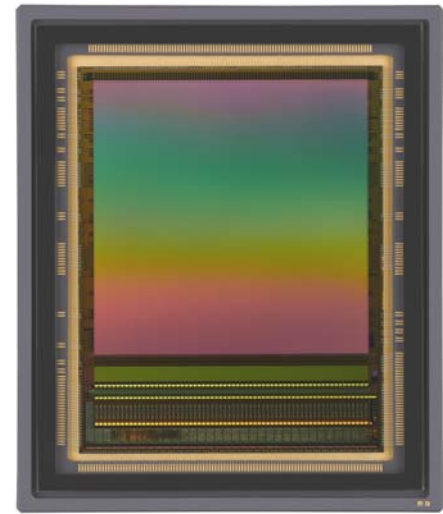
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SPECIFICATIONS

Key Specifications

Table 1. GENERAL SPECIFICATIONS

Parameter	Specification
Active pixels	5120 (H) x 5120 (V)
Pixel size	4.5 μm x 4.5 μm
Shutter type	Pipelined and triggered global shutter, rolling shutter
Master clock	340 MHz (10-bit default) 272 MHz (8-bit)
Windowing features	32 Randomly programmable windows. Normal, sub-sampled and binned readout modes
ADC resolution	10-bit, 8-bit
Frame rate at full resolution in Zero−ROT mode	VITA 12MP: 160 fps VITA 16MP: 125 fps
Number of LVDS outputs	32/16 data + 1 sync + 1 clock
Data rate	32/16 x 680 Mbps (10-bit default) 32/16 x 544 Mbps (8-bit)
Power dissipation	4.2 W @ ~2 Gpix/s (32 LVDS) 2.5 W @ ~1 Gpix/s (16 LVDS)
Package type	355 μPGA
Color	RGB color, mono, NIR

Table 2. ELECTRO−OPTICAL SPECIFICATIONS

Parameter	Specification
Optical format	VITA 12 MP: 4/3" VITA 16 MP: 35 mm
Conversion gain	0.0634 LSB10/e$^-$, 79.36 μV/e$^-$
Temporal noise	2.13 LSB10, 34e$^-$ in global shutter 1.42 LSB10, 23e$^-$ in rolling shutter
Responsivity at 550 nm	18 LSB10 /nJ/cm^2, 3.4 V/lux.s
Parasitic Light Sensitivity (PLS)	<1/900 at 550 nm
Full well charge	15300 e$^-$
MTF	67% in x-dir, 69% in y-dir @ 535 nm 63% in x-dir, 60% in y-dir @ 635 nm
Quantum efficiency (QE) x FF	50% at 550 nm
Pixel FPN	0.39 LSB10, 6 e$^-$
Row FPN	0.5 LSB10
Column FPN	1.0 LSB10
Dynamic range	53 dB in global shutter mode 57 dB in rolling shutter mode
Signal-to-Noise Ratio (SNR)	43.4 dB
Dark signal	1.1 LSB10/s, 1.37 mV/s at +40°C

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

Worldwide Sales and Design Support

ON Semiconductor CMOS Image Sensor Business Unit offers standard and customized CMOS image sensors for consumer as well as industrial and professional applications. Consumer applications include solutions for fast growing high-speed machine vision, motion monitoring, medical imaging, intelligent traffic systems, security, and barcode applications. Our customized CMOS image sensors are characterized by very high pixel counts, large area, very high frame rates, large dynamic range, and high sensitivity.

ON Semiconductor maintains a worldwide network of offices, customer service centers, manufacturer's representatives and distributors. For more information on image sensors, contact imagesensors@onsemi.com.