



## CMOS high definition (HD) image sensor

### Description

The viimagic 9221/22 is a high performance, low power, 2/3" HD resolution (1920 x 1080 pixel) CMOS image sensor capable of capturing still or motion images suitable for many applications in the industrial area.

This CMOS sensor can be used in various scanning modes employing global or rolling shutter with electronic exposure control up to a maximum HDTV frame rate of 240Hz.

Due to the integrated ADCs, programmable sensor control and timing functions it offers a high degree of flexibility for the end product with a minimum of external components beyond the standard video rates and formats. Main applications are high performance video cameras and high resolution measurement devices. In the high dynamic range mode, the dynamic range of the sensor can be extended beyond 120dB by multi sampling or selecting the non-linear response curve.

### Features

- HD CMOS image sensor (Resolution 1920 / 2048 x 1080 pixel)
- Quadruple on-chip 12-bit A/D converters
- High dynamic range (HDR) capability
- Equivalent pixel clock: 600MHz (maximal)
- Region of interest: horizontal sub-sampling by 32 column blocks and line wise vertical sub-sampling
- Variable pixel clock rate, flexible scanning schemes (interlace, progressive)
- Square pixel 5  $\mu$ m
- $\mu$ -lens for improved sensitivity
- Programmable gain
- Various synchronization modes (master/slave, trigger)
- Global and rolling electronic shutter
- Selectable readout modes
  - High speed analog double sampling
  - Best performing correlated digital double sampling (DDS)
- On-chip temperature sensor to allow temperature compensation
- Supply voltages: 3.3V (typ.) for core interfaces, 1.8V (typ.) for digital logic
- BGA-108 package (27 mm x 27 mm)

### Applications

- Targeted for high performance applications
- High-end surveillance
- Industrial vision
- Medical imaging
- Traffic monitoring

### Options

- 9221 Monochrome
- 9222 Color, RGB Bayer

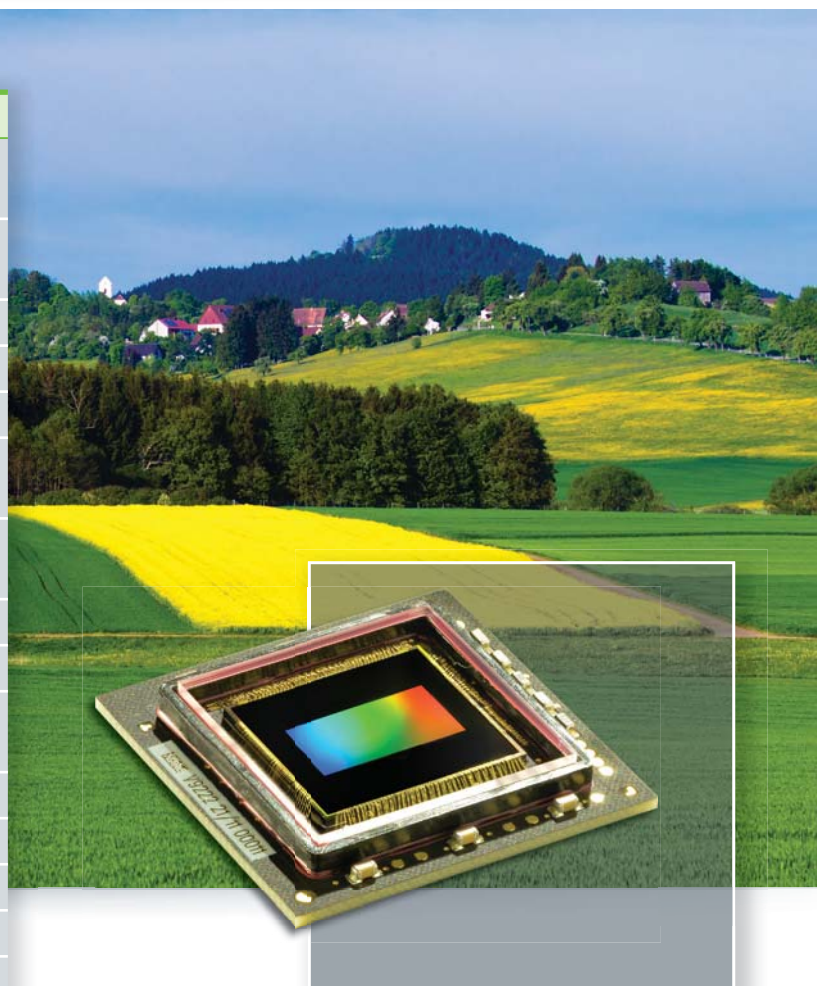
Parameter	Typical Values
Array format	Total: 2112 H x 1124 V Active: 2068 H x 1100 V
Effective image area	Total: 10.56 mm x 5.62 mm Active: 10.34 mm x 5.50 mm
Optical format	2/3" (1920 x 1080 pixel)
Pixel size	5 $\mu$ m x 5 $\mu$ m
Video outputs	4 x 2 LVDS
Frame rate (at full resolution)	24, 25, 30, ... 120 fps DDS 24, 25, 30, ... 240 fps CDS
Dynamic range	Linear Mode: > 60 dB High dynamic mode: > 120 dB
Electronic shutter	Global/Rolling shutter
Sensitivity	6 V/lux sec (@ 560 nm)
Video SNR	57 dB (Green 3 Lux, BW=0.4 ... 30 MHz)
Quantum efficiency	55 %
Random noise	< 6e (in dark area)
Full well capacity	16ke
FPN	6e (with digital double sampling)
PRNU	< 1.0 %
Supply voltage <sup>1</sup>	3.3 V, 1.8 V (1.9V)
Power consumption <sup>1</sup>	1.1 W (@ 60 fps/DDS, 2.5V)
Operating temperature	-20° C ... +75° C
Package	BGA-108 (27 mm x 27 mm) 81 functional pins

Key performance data partly depends on operation modes.

<sup>1</sup>For power optimization it is possible to operate LVDS transmitters at 2.5V.  
For system clock operation above 85MHz use 1.9V for ADC supply voltage.

#### Disclaimer:

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