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 240 Hz. 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 120 dB 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: 600 MHz (maximal)
- Region of interest: horizontal sub-sampling by 32 column blocks and line wise vertical sub-sampling
- Variable pixel clock rate, flexible scanning schemes (interface, progressive)
- Square pixel 5 μm
- μ-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: 3.3 V (typ.) for core interfaces, 1.8 V (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

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<th>Parameter</th>
<th>Typical Values</th>
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| 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 μm x 5 μm                                                                   |
| 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 voltage¹               | 3.3 V, 1.8 V (1.9V)                                                           |
| Power consumption¹            | 1.1 W (@ 60 fps/DDS, 2.5V)                                                    |
| Operating temperature         | -20°C ... +75°C                                                               |
| Package                       | BGA-108 (27 mm x 27 mm)                                                       |

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

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