

1.0 Megapixel SMIA Camera Module

DATA BRIEF

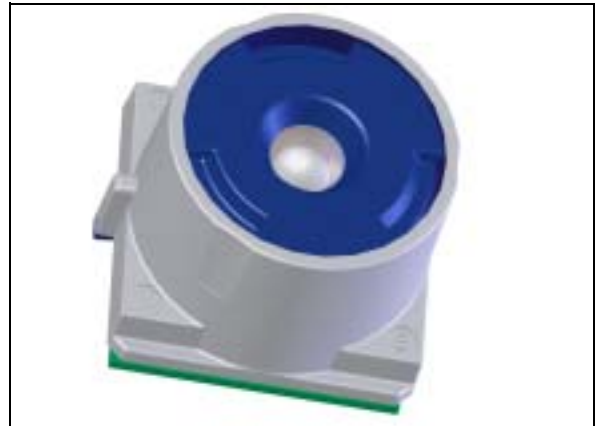
FEATURES

- 1.0 Megapixel resolution (1152H x 864V)
- SMIA¹ 1.0 profile 1 compliant imager
- CCP 2.0 serial video interface
- Two-wire control port (CCI)
- On-chip PLL based on 13 MHz system clock
- Up to 30 frame per second (fps) progressive scan, with smooth frame rate control
- Horizontal downscale from 1x to 4.5x in 1/16 steps
- Operation from 2.4 V analog power supply
- Low EMI 1.8 V digital and I/O power supply
- 30 μ W power-down consumption
- 10-bit on-chip ADC
- Small size 1/3 inch lens fixed focus module
- Integral EMC shielding

DESCRIPTION

The VS6650 is a 1.0 Megapixel camera module for use across a range of mobile phone platforms. The camera module, which is SMIA 1.0 profile 1 compliant, can generate 1.0 Megapixel images up to 30 fps.

Based on the SMIA architectural concepts, the VS6650 can be used with or without image processor (i.e. STV0976 or STV0984). The module is suitable for performance-driven camera phones and cost-driven high volume designs. The embedded horizontal scaler typically enables the realization of power-efficient viewfinder that uses host software processing. For performance driven applications or when a different video interface is required, the STV0976 mobile imaging processor ensures state-of-the-art image reconstruction and compression at up to 15 fps.



The VS6650 features allow straightforward integration into mobile phone designs: low EMI video interface and package/socket shielding, low wire count (8 total), embedded power management (30 μ W power-down) and embedded PLL. A minimal list of external components is required: supply decoupling capacitors, CCI pull-ups and a charge-pump capacitor.

The VS6650 3-element lens design ensures high quality image capture while maintaining low module height. The overall optical stack, including lens system, IR filter and sensor optical structures is developed within ST.

The VS6650 package uses the second generation of SmOP2 packaging technology. Sensor and lens are assembled in a fully automated test and focus process for high volume and low cost production. This 1.0 Megapixel sensor fits within the SMIA95 form factor (9.5 x 9.5 x 7.6 mm³).

APPLICATIONS

- Mobile phone
- PDA
- Wireless security camera

Table 1. Order Codes

Part Number	Description
VS6650S02F/T2	SmOP2 SMIA95 22" tape and reel



1. Standard Mobile Imaging Architecture, visit www.smia-forum.org

Figure 1. Application Diagram

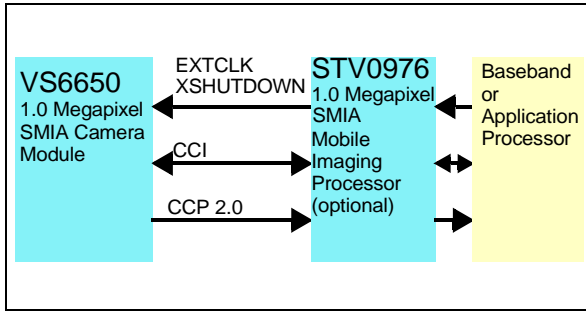


Figure 2. Block Diagram

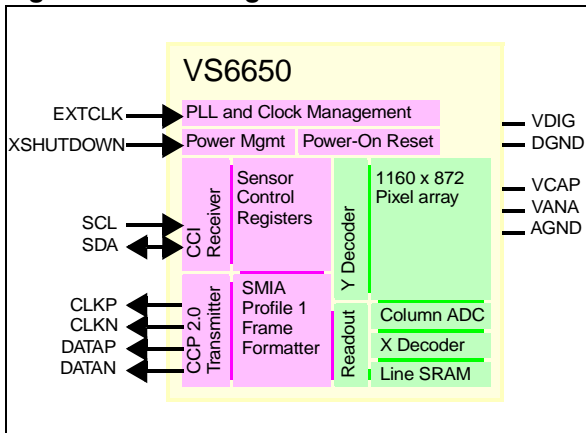


Figure 3. Outline Drawing

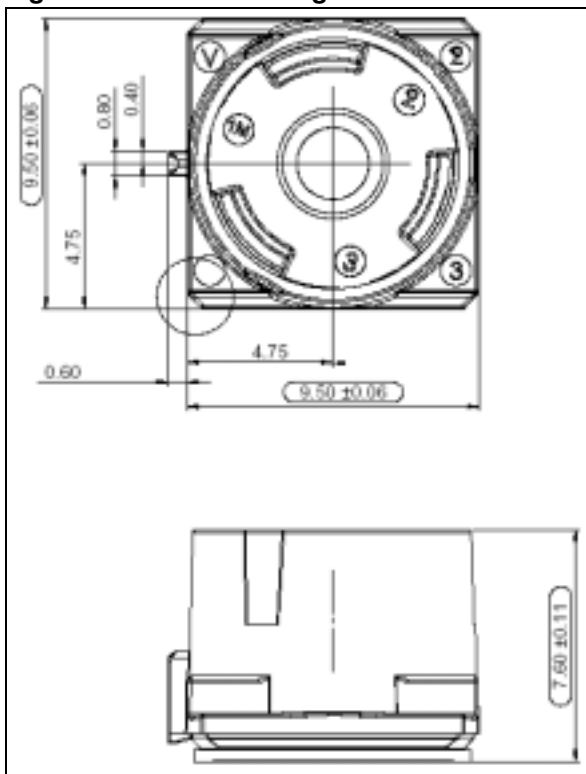


Table 2. Technical Specifications

Active pixels	1152H x 864V
Pixel size	4.0 μm x 4.0 μm
Array size	4.640 mm x 3.488 mm
Color filter array	RGB Bayer
Exposure control	+120 dB
Analog gain	+24 dB (max)
Dynamic range	61 dB (typical)
Signal-to-noise Ratio	35 dB at 100 lux
Frame rate	5 to 30 Hz (1152H x 864V)
Pixel format	Raw Bayer 10-bit Raw Bayer 8-bit compressed
Video Interface	CCP 2.0 high-speed serial 390 Mbit/s D/S encoding 1.8 V LVDS
Clock input	6 to 27 MHz square 13 MHz typ. (on-chip PLL)
Supply voltage	2.4 to 2.9 V analog 1.8 V ± 0.1 V digital
I/O voltage	1.8 V CMOS levels
Power consumption	Streaming @ 15 fps: 85 mW max. Power down: 15μW max.
Lens	3-element 50° HFOV f#3.2
Depth of field	50 cm to infinite
TV distortion	< 1 %
Relative illumination	45 % (typical)
Package type	SmOP2 SMIA 95
Package size	9.5 x 9.5 x 7.6 mm ³ (wlh)
System attach	16-pin SMD socket with EMC shield

Table 3. Temperature Range

Storage	-40 to +85°C
Functional	-30 to +70°C
Normal operating	-25 to +55 °C
Optimal operating	+5 to +30°C
Test	23 ± 2°C

REVISION HISTORY

Table 4. Revision History

Date	Revision	Description of Changes
October 2004	1	First Issue

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