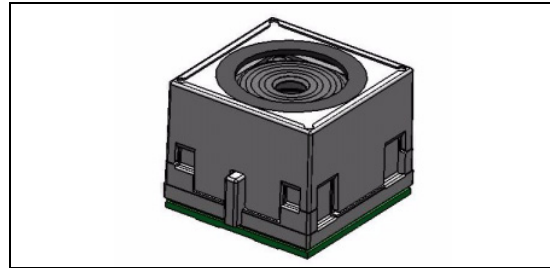


## 3.2 Megapixel QXGA camera module with auto focus

Data Brief

### Features

- 3.2 Megapixel resolution (2048H x 1536V)
- 2.2  $\mu\text{m}$  pixel size, 1/3.2 inch optical format
- RGB Bayer color filter array
- Integrated 10-bit ADC
- Fully integrated auto-focus mechanism
- Multi-element, high quality lens
- SMIA Profile 2 Functional & CCP2 compliant
- Up to 20 fps QXGA progressive scan
- Up to 30 fps 1024x768 via sub-sampling or 2x2 analogue binning
- Smooth frame rate control
- Full raw Bayer down scaler from 1x to 8x in steps of 1/16<sup>th</sup>
- Output pixel rate de-rating with scaling
- Integrated defect correction
- Automatic dark level calibration
- CCP2 SubLVDS bit-serial interface (640 Mbps)
- 2-wire 400 kHz camera control interface (CCI)
- On-chip PLL, 6.0 to 27 MHz clock input
- Analog power supply: 2.4 to 2.9V
- Separate digital I/O power supply: 1.7 to 2.9V
- Ultra low power standby mode (< 30 $\mu\text{W}$ )
- 9.5 x 9.5 x 7.6 mm<sup>3</sup> auto focus camera module with embedded passives
- Integral EMC shielding and EMI reduction techniques
- Lead-free RoHS compliant product



### Description

The VB6850 is a QXGA auto-focus raw Bayer camera module targeting mobile applications. Manufactured using ST 0.13  $\mu\text{m}$  CMOS imaging process, it integrates a high performance 2.2  $\mu\text{m}$  pixel and is compliant with both the functional (Profile 2) and CCP2 parts of the SMIA specification revision 1.0.

VB6850 is capable of streaming QXGA raw Bayer image data up to 20 fps.

The auto-focus mechanism combined with a multi-element lens provides excellent image quality at focus distances from less than 10 cm to infinity.

All external components, including the auto-focus actuator drivers, are integrated inside the camera module, apart from two CCI pull-up resistors. Control of the integrated AF driver is via the VB6850 CCI I/F yielding straight forward system integration.

Figure 1. Application diagram

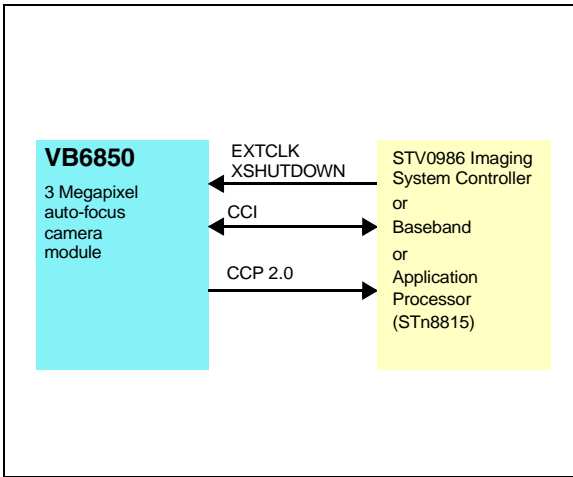


Figure 2. Block diagram

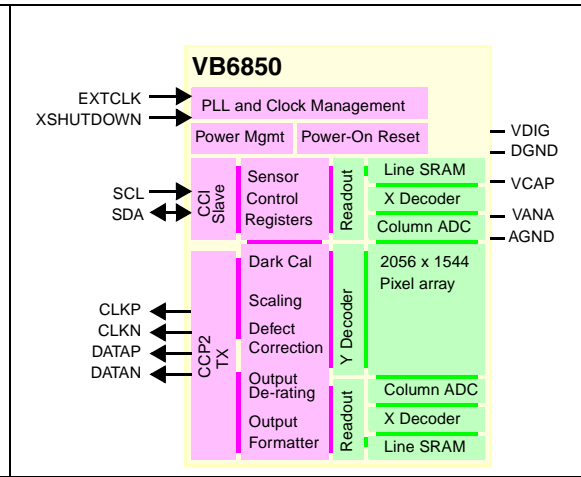
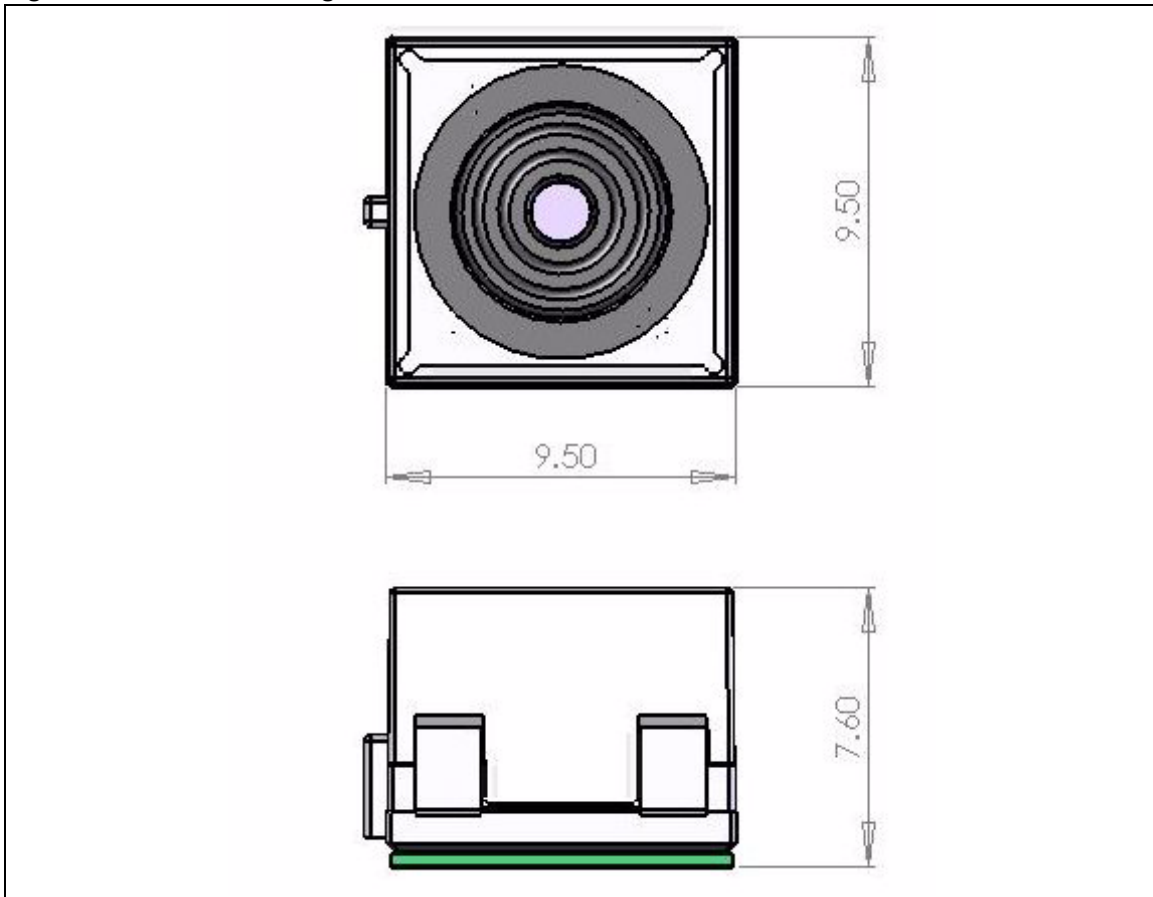


Figure 3. Outline drawing



**Table 1. Technical specifications**

Active Pixels	2048H x 1536V (QXGA)
Physical pixel array	2056H x 1544V
Pixel size	2.2 $\mu\text{m}$ x 2.2 $\mu\text{m}$
Color filter array	RGB Bayer
Sensor technology	0.13 $\mu\text{m}$ HCMOS9I
Exposure control	+81 dB
Analog gain	+24 dB (max.)
Dynamic range	60 dB (typical)
Signal-to-noise ratio (SNR)	37 dB at 100 lux (typical)
Frame rate	1 to 20 Hz QXGA
Pixel format (s)	RAW Bayer 8-bit RAW Bayer 10-bit RAW Bayer 10 to 8-bit compressed
Video interface(s)	CCP2 Class2 640 Mbps
Control interface	400 kHz CCI
Clock input	6.0 to 27 MHz square (on-chip PLL)
Supply voltage	Analogue: 2.7 V - 2.9 V Digital IO: 1.7 V - 2.9 V Vact: 2.8V (nominal)
Power consumption	<200 mW (@20 frame/s) <30 $\mu\text{W}$ (standby mode)
Lens	51° $\pm$ 2 HFOV, f# 2.8
Depth of field	10 cm -> infinity
TV distortion	< 1%
Relative illumination	50% (typ)
Package type	AF95
Package size	9.5 mm x 9.5 mm x 7.6 mm (wlh)
System attach	Socket <sup>(1)</sup> and Flex <sup>(2)</sup>

1. VB6850 module is compatible with the SMIA95 socket.

2. VB6850 module is compatible with flex attach.

**Table 2. 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 $\pm$ 2°C

## Ordering information

**Table 3. Order codes**

Part number	Package
VB6850S02I/T2	SMIA95 AF 9.5 mm x 9.5 mm x 7.6 mm - Socket

## Revision history

**Table 4. Document revision history**

Date	Revision	Changes
12-Jan-2007	1	Initial release.

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