## Features

- 1/4" VGA Digital Camera Module with Built-in Lens
- Turnkey Solution with CMOS Color Image Sensor and On-chip Image Processing
- High Performance:
  - Ultra-compact Size
  - Very Low Power Consumption
  - High Sensitivity
  - Low Fixed Pattern Noise
  - High Dynamic Range
  - Up to 30 fps at Full Resolution
- Easy to Operate:
  - Single Master Clock Operation (Integrated PLL)
  - On-chip Timing Generator
  - Two-wire Interface (TWI)
  - Single 2.5V Power Supply
- Built-in Functions:
  - Up to 5x Digital Zoom (Up to 17 Steps)
  - Photo and Video Capabilities
  - Multiple Region of Interest (Programmable)
  - Mirror Function
  - Decimation: CIF/QCIF/QVGA/Q$_2$VGA/SQCIF with Same Angle of View
  - Flash Synchronization
  - On-chip 10-bit A/D Converter
  - Automatic Dark Calibration
  - Power Management Unit
- Built-in Image Processing:
  - Lens Vignetting Correction (Programmable)
  - Defective Pixel Correction
  - Color Interpolation, Color Correction (Programmable)
  - Color Saturation (Programmable)
  - Gamma Correction (Programmable)
  - RGB to YCrCb Transformation
  - Edge Enhancement (Programmable)
  - Noise Reduction (Programmable)
  - Anti-aliasing Filter
  - 8-bit 4:2:2 YCrCb Output Format
  - White Balance (Auto/Manual Control Selectable)
  - Exposure Control (Auto/Manual Control Selectable)
  - Flicker Detection and Correction (Auto/Manual Control Selectable)

## Main Specifications

- CMOS Sensor: 640 × 480 Active Pixel Array
- Pixel Size: 5.6 × 5.6 µm
- Optical Format: 1/4"
- Frame Rate: Up to 30 fps
- Power Consumption at 15 fps: 60 mW
- Dynamic Range: 55 dB
- Sensitivity: 25 Scene Lux at 15 fps
- Output Format: YCrCb 4:2:2 (27 MHz), RGB Bayer (13.5 MHz)
- Color Filter: Bayer RGB with Micro Lens
- Input Frequency: 3 to 80 MHz
- Field of View: 48° (H), 38° (V), 61° (D)
- F-number: 2.8
- Focal Length: 4 mm
- Module Size: 9.5 × 9.5 × 5.63 mm$^3$
- Package: Flexible Cable on Printed Circuit Board

Eye-On-Si™ Color VGA Ultra-compact CMOS Digital Camera

AT76C451BC-MY15AT

Preliminary Summary

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## Description

The AT76C451BC-MY15AT CMOS camera module is a turnkey system ideal for mobile phones and PDA applications. This complete image solution provides a VGA standard image format using on-chip image processing that provides high-quality images. The module is integrated on an ultra-thin module and has a very low power consumption.

The Eye-On-Si VGA includes a digital zoom from 1× to 5× in up to 17 steps. This digital zoom is very progressive like those available in cameras that include an optical zoom. The image resolution is the same at each step and can be adapted to the output screen.

The Eye-On-Si provides you with the ability to adjust the image processing functionalities to obtain sharp and crisp images and to meet color fidelity requirements under various environmental conditions. Automatic exposure control and automatic white balance maintain the average luminance of the scene and the consistency of colors in different lighting. Automatic flicker detection and cancellation eliminate perturbations due to modulation of an artificial light source with either a 50 or 60 Hz voltage supply.

The Eye-On-Si VGA also includes a noise reduction algorithm called *coring* that eliminates video noise in the low-frequency part of the image.

The device also features a very high level of readout functionalities by providing the same angle of view for standard image resolutions (CIF, QCIF, QVGA, etc.). This enables video acquisition in CIF format with the maximum angle of view.

Easy to integrate into any application, the Eye-On-Si VGA operates with a single power supply and within a frequency range of 3 to 80 MHz thanks to its on-chip PLL circuitry.

Easy to monitor, the on-chip functions and image processing are programmable through a Two Wire Interface (TWI).

## Applications

- Mobile phones/PDAs
- Dual mode cameras
- Home phones
- Notebook computers
- PC cameras
- Camcorders
- Toys

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