OV50A40

50 megapixel product brief

50MP Image Sensor With 100% Phase Detection Coverage for Superior Autofocus in Flagship and High End Smartphones

OMNIVISION's OV50A is a 50 megapixel (MP) image sensor with a 1.0 micron pixel size, selective conversion gain and a 1/1.5" optical format with quad phase detection (QPD) autofocus technology and on-chip remosaic. QPD enables 2x2 phase detection autofocus (PDAF) across the sensor's entire image array, for 100% coverage. Unlike the microlens and half-shield PDAF technologies, which only capture 3-6% of the phase detection data, QPD uniquely captures 100% of this data for improved distance calculation, faster autofocus and better low-light performance. In combination with on-chip remosaic for the QPD color filter array, the result is premium still image and 8K video captures for the wide and ultrawide main cameras in flagship and high end smartphones.

The OV50A image sensor features the best low-light performance in its class, via the unique combination of a large 1.0 micron pixel size, selective conversion gain's low-noise, high conversion gain mode, and a large 1/1.5" optical format. Additionally, this sensor offers excellent HDR through 2- and 3-exposure staggered HDR timing, along with selective conversion gain for the optimum balance between low-light image quality and HDR. These features provide mobile designers with maximum flexibility to select the best HDR method for the contrasting light and dark areas in any scene.

Built on OMNIVISION's PureCel®Plus-S stacked die technology, the OV50A integrates an on-chip, QPD color filter array and hardware remosaic, providing significantly improved autofocus performance along with high quality, 50MP Bayer output, or 8K video, in real time. This sensor can also use near-pixel binning to output a 12.5MP image for 4K2K video with four times the sensitivity, yielding 2.0 micron-equivalent performance for preview and video. In either case, the OV50A can consistently capture the highest quality images, as well as enabling 2x digital crop zoom with 12.5MP resolution and fast mode switch.

Output formats include 50MP, or 8K video, with QPD autofocus at 30 frames per second (fps), 12.5MP with QPD autofocus at 60 fps, 4K2K video with QPD autofocus at 90 fps, 1080p at 240 fps and 720p at 480 fps. All of these options can be output at up to 3.5 Gsps per trio, over the sensor's CPHY MIPI interface.

Find out more at www.ovt.com.

OMNIVISION™

OV50A40

Applications

- smart phones
- video conferencing
- PC multimedia

Technical Specifications

- **active array size:** 8192 x 6144

- **maximum image transfer rate:**
  - 8192 x 6144: 30 fps

- **power supply:**
  - core: 1.1V
  - analog: 2.8V
  - I/O: 1.8V/1.2V

- **power requirements:**
  - active: 999 mW (50MP @ 30 fps)
  - XSHUTDOWN: <10 µA

- **output formats:**
  10-bit RGB RAW

- **temperature range:**
  - operating: -30°C to +85°C junction temperature
  - stable: 0°C to +60°C junction temperature

- **lens size:** 1/1.55"

- **lens chief ray angle:** 36.24° non-linear

- **scan mode:** progressive

- **pixel size:** 1.008 µm x 1.008 µm

- **image area:**
  8289.792 µm x 6225.408 µm

Product Features

- automatic black level calibration (ABLC)

- programmable controls for:
  - frame rate
  - mirror and flip
  - binning
  - cropping
  - windowing

- support for dynamic DPC

- supports output formats:
  - 10-bit RGB RAW

- supports horizontal and vertical subsampling

- supports typical images sizes:
  - 8192 x 6144
  - 4096 x 3072
  - 4624 x 4320
  - 1920 x 1080
  - 1280 x 720

- up to 4-lane MIPI D-PHY TX interface with speeds up to 3.0 Gbps/lane

- 2/3 trio C-PHY interface, up to 3.5 Gsps/trio

- supports type 2 QPD PDAF

- HDR support:
  - stagger HDR 2/3 exposure timing

- high gain mode support, up to 63.75x for full resolution and 255x for 4-cell binning SCG mode

- dual I/O power supply (1.2V/1.8V)

- three on-chip phase lock loops (PLLs)

- programmable I/O drive capability

- standard serial SCCB interface

- built-in temperature sensor

- 1.008 µm pixel

Functional Block Diagram

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