



# OMNIVISION OV50E 50MP Image Sensor User Guide

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## OMNIVISION OV50E 50MP Image Sensor



## Introduction

The OV50E image sensor brings the industry's best low light image and high dynamic range (HDR) video capturing capabilities to rear-facing main cameras in high-end and mainstream smartphones. The OV50E features staggered HDR and DCG™ technology for improved HDR and crop zoom support, 100% quad phase detection (QPD) for enhanced autofocus, and better low light performance over previous- generation image sensors. The new OV50E combines 50MP resolution and 1.0 µm pixel size in a 1/1.5-inch optical format.

The OV50E can achieve up to 64x analog gain for full resolution, or 256x analog gain for 4 cell binning resolution. Built on OMNIVISION's PureCel®Plus-S stacked die technology, the OV50E can also use near-pixel binning to output a 12.5MP image or 4K2K video with four times the sensitivity, yielding 2.0 µm-equivalent performance for preview and video. The maximum dynamic range reaches more than 100 dB.

The OV50E's second-generation QPD enables 2x2 phase detection autofocus across the sensor's entire image array for 100% coverage, resulting in improved distance calculation, faster autofocus and better low-light performance. Premium image quality is further enabled by the combination of on-chip remosaic for the QPD color filter array to full Bayer resolution.

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 60 fps; and 1080p at 240 fps. The OV50E supports the CPHY/DPHY MIPI interface and dual DOVDD 1.8/1.2V.

Find out more at [www.ovt.com](http://www.ovt.com).

## Applications

- smart phones
- video conferencing
- PC multimedia

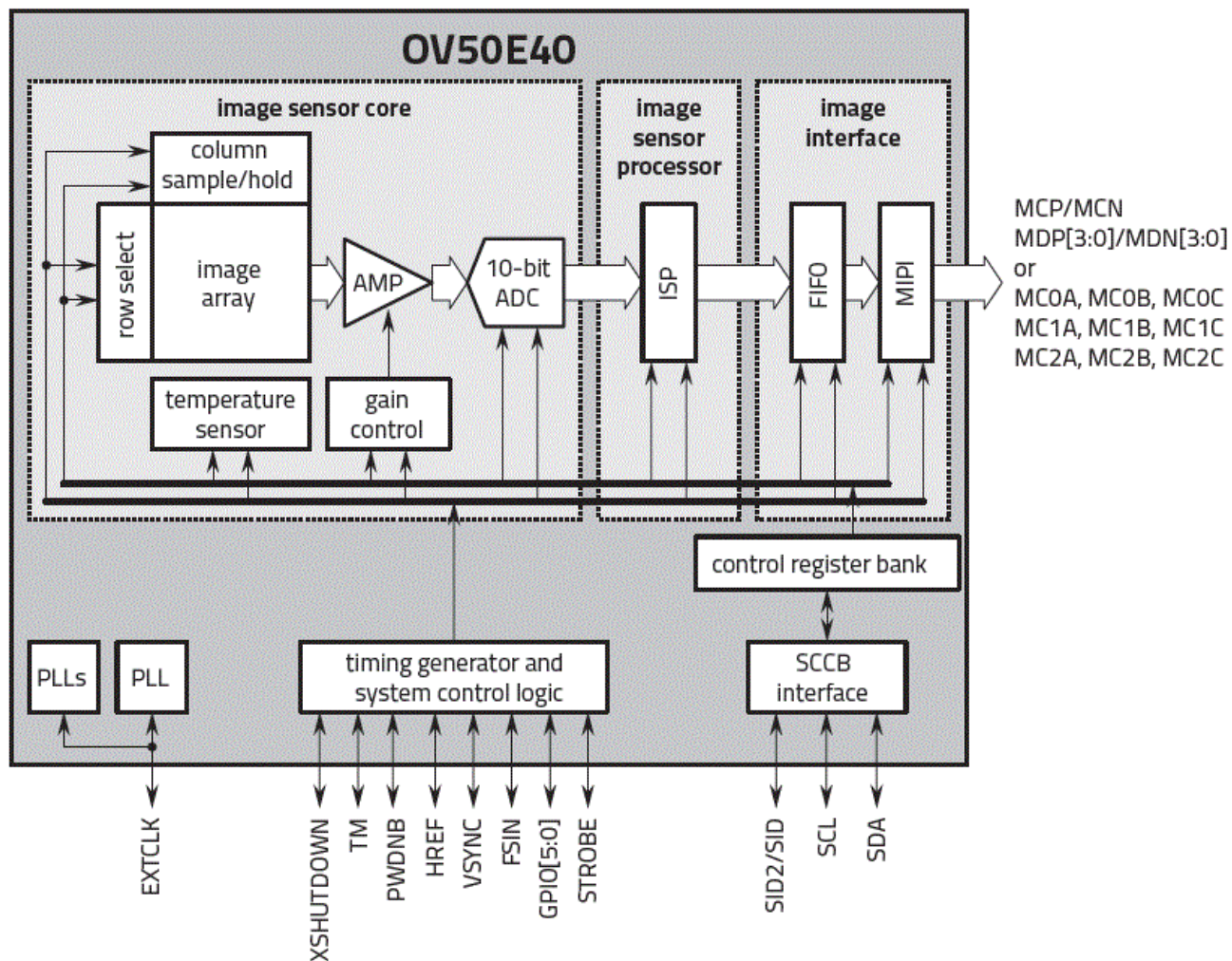
## Technical Specifications

- active array size: 8224 x 6176
- 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: TBD (50MP @ 24 fps)
  - XSHUTDOWN: <10 µA
- output formats:
  - 10/12/14-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: 36.75° 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
  - 12/14-bit RGB RAW  
after DCG combination
- supports horizontal and vertical subsampling
- supports typical images sizes:
  - 8192 x 6144
  - 4096 x 3072
  - 4096 x 2304
  - 1920 x 1080
  - 1280 x 720
- standard serial SCCB interface
- up to 4-lane MIPI 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:
  - DCG RAW or combined RAW
  - stagger HDR 2/3 exposure timing
  - DCG RAW or DCG combined  
RAW + VS RAW
- on-chip QPD to Bayer converter
- three on-chip phase lock loops (PLLs)
- programmable I/O drive capability
- built-in temperature sensor
- 1.008  $\mu\text{m}$  pixel


## Functional Block Diagram



4275 Burton Drive Santa Clara, CA 95054 USA

Tel: + 1 408 567 3000 Fax: + 1 408 567 3001 [www.ovt.com](http://www.ovt.com)

## Documents / Resources

 <p><b>OV50E</b> 50MP image sensor product brief</p> <p>New 50MP image sensor brings industry-leading, low light, 1080p image and 4K video performance to new Fusion Smartphone Camera</p>	<p><b>OMNIVISION OV50E 50MP Image Sensor</b> [pdf] User Guide  OV50E, 50MP Image Sensor, OV50E 50MP Image Sensor, Image Sensor, Sensor</p>
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