20-Megapixel Second-Generation 1.0-Micron PureCel®Plus-S Sensor for Smartphones

OmniVision’s OV20381 is an ultra-compact image sensor designed specifically to bring 20-megapixel resolution to high-end, dual-camera mobile zoom solutions using OmniVision’s second-generation, 1.0-micron PureCel®Plus-S pixel technology. The OV20381 offers advanced features such as zig-zag high dynamic range (zHDR) and support for dual-camera functionality with context switching, scaler and electronic image stabilization (EIS). The on-chip EIS also enables advanced capabilities such as image deblur.

zHDR uses a long and a short exposure in a single frame to extend dynamic range capabilities of the sensors. Long and short exposure lines are diagonally interlaced across the entire pixel array in a zig-zag pattern. This enables live preview and video recording in HDR mode and single-shot full-resolution HDR images in capture mode without any shutter lag.

The OV20381 captures full-resolution 20-megapixel images and video with zHDR capability at 30 fps, ultra-high-resolution 4K2K video with full field-of-view at 60 fps, and 1080p high definition (HD) video at 120 fps. The OV20381 offers both MIPI D-PHY and C-PHY interfaces.

The OV20381 comes in a package size of 8.5 x 8.5 mm with a z-height of 5.3 mm.

Find out more at www.ovt.com.
OV20381

Applications
- Smartphones
- Video Conferencing
- PC Multimedia

Product Features
- Automatic black level calibration (ABLC)
- Programmable controls for:
  - Frame rate
  - Mirror and flip
  - Cropping
  - Windowing
- Support for dynamic DPC cancellation
- Supports output formats:
  - 10-bit RAW
  - DPCM 10-B compression
- Supports horizontal and vertical subsampling
- Supports typical image sizes:
  - 5184 x 3888
  - 3840 x 2160
  - 2560 x 1440
  - 1920 x 1080
  - 1280 x 720
  - 1000 x 568
  - 800 x 480
- Programmable I/O drive capability
- Standard serial SCCB interface with speed up to 1 MHz (when clock input is >10 MHz)
- Sequential multi-frame HDR
- Up to 4-lane MIPI TX interface with speed up to 1.92 Gbps/lane
- Programmable I/O drive capability
- Embedded 20kbits of one-time programmable (OTP) memory with 12 kbits reserved for customer use
- Gyro interface with 4-wire SPI and EIS support
- Long exposure time of up to 30 seconds
- Two on-chip phase lock loops (PLLs)
- Built-in temperature sensor
- Typical module size: 8.5 x 8.5 x 5.3 mm

Product Specifications
- Active array size: 5184 x 3888
- Power supply:
  - Core: 1.05 V
  - Analog: 2.8 V
  - IO: 1.8 V
- Power requirements:
  - Active: 349 mW
  - Standby: 10 mW
  - XSHUTDOWN: 5 µA
- Temperature range:
  - Operating: -30°C to +85°C junction temperature
  - Stable image: 0°C to +60°C junction temperature
- Output formats: 10-bit RAW, DPCM 10-B compression
- Lens chief ray angle: 34.86° non-linear
- Maximum image transfer rate:
  - 5184 x 3888: 30 fps
  - 2560 x 1944: 120 fps
- Input clock frequency: 6 - 27 MHz
- Dynamic range: 73.2 dB @ 16x gain
- Scan mode: Progressive
- Pixel size: 1.0 µm x 1.0 µm
- Image area: 5257.73 µm x 3951.36 µm
- Die dimensions:
  - COB: 6210 µm x 4446 µm
  - RW: 6260 µm x 4515.8 µm

Ordering Information
- OV20381-GASA
  (B&W, chip probing, 150 µm backgrinding, reconstructed wafer with good die)

Functional Block Diagram