Dual-Purpose RGB IR CameraChip™ Sensor Brings High Sensitivity and High Frame Rates to Mobile and Machine Vision Applications

OmniVision’s OV4682 is a 4-megapixel RGB infrared (IR) single sensor that captures high-resolution images and video as well as IR information. Its dual RGB and IR capabilities allow it to bring a host of additional features to mobile and machine vision applications, including gesture sensing, depth analysis, iris detection and eye tracking. By combining two capabilities into a single sensor, the OV4682 reduces the total cost for the system while also reducing the space required for multiple sensors.

The sensor’s 2-micron OmniBSI-2™ pixel delivers excellent signal-to-noise ratio and IR sensitivity, and offers best-in-class low-light sensitivity with a 40 percent increase in sensitivity compared to the 1.75-micron OmniBSI-2 pixel. The OV4682’s unique architecture and pixel optimization bring not only the best IR performance but also best-in-class image quality. Additionally, the sensor reduces system-level power consumption by optimizing RGB and IR timing.

The OV4682 records full-resolution 4-megapixel video in a native 16:9 format at 90 frames per second (fps), with a quarter of the pixels dedicated to capturing IR. The 1/3-inch sensor can also record 1080p high definition (HD) video at 120 fps with electronic image stabilization (EIS), or 720p HD at 180 fps.

The OV4682 features a high-speed 4-lane MIPI serial output interface to facilitate the required high data transfer rate. It fits into an 8.5 x 8.5 mm module with a z-height of less than 6 mm.

Find out more at www.ovt.com.
**Applications**
- Cellular Phones
- Tablets
- Digital Still Cameras (DSC)
- Digital Video Camcorders (DVC)
- Security
- Gaming
- Gesture Detection

**Ordering Information**
- OV4682-G04A-1D
  (RGB-IR, chip probing, 200 µm backgrinding, reconstructed wafer with good die)

**Product Features**
- automatic black level calibration (ABLC)
- programmable controls for frame rate, mirror and flip, cropping, and windowing
- static defective pixel canceling
- supports output pixel sizes: 10-bit RAW RGB-IR (MIPI)
- supports horizontal and vertical subsampling
- supports image sizes: 1MP, 3MP, E1S1080p, 1080p, E1S720p
- fast mode switching
- support 2x2 binning, 4x4 binning, re-sampling filter
- standard serial SCCB interface
- up to 4-lane MIPI serial output interface
- embedded 4K bits one-time programmable (OTP) memory for part identification, etc.
- two on-chip phase lock loops (PLLs)
- programmable I/O drive capability
- built-in temperature sensor

**Product Specifications**
- **active array size**: 2688 x 1520
- **power supply**: 
  - core: 1.1 ~ 1.3V
  - analog: 2.6 ~ 3.0V
  - I/O: 1.7 ~ 3.0V
- **power requirements**: 
  - active: 163 mA (261 mW)
  - standby: 1 mA
  - XSHUTDOWN: -10 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 RGB data
- **lens size**: 1/3”
- **input clock frequency**: 6 ~ 64 MHz
- **lens chief ray angle**: 21° non-linear
- **maximum image transfer rate**: 
  - 2688x1520: 90 fps
  - 1920x1080: 120 fps
  - 1280x720: 180 fps
  - 672x384: 330 fps
- **scan mode**: progressive
- **maximum exposure interval**: 1548 x T exposures
- **pixel size**: 2 µm x 2 µm
- **dark current**: 4 mV/sec at 60°C junction temperature
- **image area**: 5440 µm x 3072 µm
- **die dimensions**: 
  - COB: 6600 µm x 5800 µm
  - RW: 6650 µm x 5850 µm

**Functional Block Diagram**

```
image sensor core
  | column sample/hold |
  | image array |
  | AMP |
  | temperature sensor |
  | gain control |

image sensor processor
  | 10-bit ADC |
  | rising edge |

image output interface
  | control register bank |
  | PLLs |
  | PLL |
  | timing generator and system control logic |
  | SCCB interface |
```