OV7663/OV7163 CMOS VGA (640x480) CAMERACHIP™ with OmniPixel® Technology

General Description

The OV7663/OV7163 CAMERACHIP™ is a low voltage CMOS image sensor that provides the full functionality of a single-chip VGA camera and image processor in a small footprint package. The OV7663/OV7163 provides full-frame, sub-sampled or windowed 8-bit images in a wide range of formats, controlled through the Serial Camera Control Bus (SCCB) interface.

This product has an image array capable of operating at up to 30 frames per second (fps) in VGA with complete user control over image quality, formatting and output data transfer. All required image processing functions, including exposure control, gamma, white balance, color saturation, hue control and more, are also programmable through the SCCB interface. In addition, OmniVision CAMERACHIPS use proprietary sensor technology to improve image quality by reducing or eliminating common lighting/electrical sources of image contamination, such as fixed pattern noise (FPN), smearing, blooming, etc., to produce a clean, fully stable color image.

Note: The OV7663/OV7163 uses a lead-free package.

Features

- High sensitivity for low-light operation
- Low operating voltage for embedded portable apps
- Standard SCCB interface
- VGA, QVGA, QQVGA, CIF, QCIF, QQCIF and windowed outputs with Raw RGB, RGB (GRB 4:2:2), YUV (4:2:2) and YCbCr (4:2:2) formats
- VarioPixel® method for sub-sampling formats
- Automatic image control functions including: Automatic Exposure Control (AEC), Automatic Gain Control (AGC), Automatic White Balance (AWB), Automatic Brightness Control (ABC), and Automatic Black-Level Calibration (ABLC)
- Image quality controls including color saturation, hue, gamma, sharpness (edge enhancement), and anti-blooming

Ordering Information

Product	Package
OV07663-VL6A (Color, lead-free)	22-pin CSP2
OV07163-VL6A (B&W with microlens, lead-free)	22-pin CSP2

Applications

- Cellular and Picture Phones
- Toys
- PC Multimedia
- Digital Still Cameras

Key Specifications

Array Element (VGA)		664 x 492
Power Supply	**Digital Core**	1.8VDC $\pm$ 10%
	Analog	2.45V to 2.8V
	I/O	2.45V to (V_{DD-A}+0.3V)
Power Requirements	**Active**	40 mW without loading
	Standby	< 10 µA
Temperature Range	**Operation**	-20°C to 70°C
	Stable Image	-10°C to 60°C
Output Formats (8-bit)		• YUV/YCbCr 4:2:2 • RGB 4:2:2 • Raw RGB Data
Lens Size		1/5"
Lens Chief Ray Angle		~20°
Max Image Transfer Rate	**VGA, CIF, QCIF, QQCIF**	30 fps
	QVGA, QQVGA	60 fps
Sensitivity		1.0 V/Lux-sec
S/N Ratio		> 48 dB (AGC off, Gamma=1)
Dynamic Range		> 72 dB
Scan Mode		Progressive
Electronics Exposure		Up to 510:1 (for selected fps)
Gamma Correction		0.45/0.55/1.00
Pixel Size		4.2 µm x 4.2 µm
Dark Current		30 mV/s at 60°C
Well Capacity		35 K e
Fixed Pattern Noise		< 0.03% of $V_{PEAK-TO-PEAK}$
Image Area		2.76 mm x 2.05 mm
Package Dimensions		4155 µm x 3975 µm
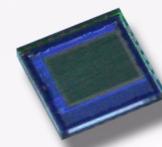
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OmniVision Technologies

Resolution
01 = Linear sensor
02 = 2 MegaPixel digital sensor
03 = 3 MegaPixel digital sensor
04 = 4 MegaPixel digital sensor
05 = 5 MegaPixel digital sensor/
     Low resolution analog sensor
06 = CIF digital sensor/
     Low resolution analog sensor
07 = VGA digital sensor/
     Full resolution analog sensor
08 = SVGA digital sensor
09 = SXGA 1.3 MegaPixel digital sensor
10 = High Dynamic Range (HDR) sensor

Type
(Analog vs. Digital, Color vs. B&W)

1 = B&W digital
4 = B&W analog
6 = Color digital
9 = Color analog

Major Iteration of Chip

Minor Iteration of Chip

0 = Color sensor with microlens
1 = B&W sensor with microlens
2 = Color sensor with microlens shift
3 = Sensor using CSP2 packaging
4 = Additional or custom features
5 = Additional or custom features
8 = SMIA-compliant sensor (except OV7648)

Grade

A, B, or C
V = Automotive grade

Package Features

0 = 48-pin
1 = 28-pin
2 = 24-pin
3 = 48-pin (large cavity CLCC)
4 = 16-pin
5 = 36-pin
6 = 22-pin
7 = 42-pin
8 = 40-pin

If Package Type = G or W, then:
0 = Chip probing
1 = No chip probing

Chip Features

0 = Digital sensor
1 = Analog NTSC sensor
2 = Analog PAL sensor
L = Lead-free package

If Package Type = G or W, then:
0 = No backgrinding
1 = Custom
2 = Standard backgrinding (300 µm)

Package Type

C = Ceramic
P = Plastic
K = Chip Scale Package (CSP)
Q = Quad Flat Package (QFP)
V = CSP2
G = Die (for COB applications)
W = Wafer

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Omni Vision