

OV7648 Color CMOS VGA (640 x 480) CAMERACHIP™
OV7148 B&W CMOS VGA (640 x 480) CAMERACHIP™

General Description

The OV7648 (color) and OV7148 (black and white) CAMERACHIPS™ are low voltage CMOS image sensors that provide the full functionality of a single-chip VGA (640 x 480) camera and image processor in a small footprint package. The OV7648/OV7148 provides full-frame, sub-sampled or windowed 8-bit images in a wide range of formats, controlled through OmniVision's Serial Camera Control Bus (SCCB) interface.

This product family has an image array capable of operating at up to 30 frames per second (fps) 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, smearing, blooming, etc. to produce a clean, fully stable color image.

Features

- High sensitivity for low-light operation
- 2.5V operating voltage for embedded portable applications
- Standard Serial Camera Control Bus (SCCB) interface
- VGA, QVGA (sub-sampled) and Windowed outputs with Raw RGB, RGB (GRB 4:2:2), YUV (4:2:2) and YCbCr (4:2:2) formats
- Automatic image control functions including: Automatic Exposure Control (AEC), Automatic Gain Control (AGC), Automatic White Balance (AWB), Automatic Brightness Control (ABC), Automatic Band Filter (ABF) for 60Hz noise and Automatic Black-Level Calibration (ABLC)
- Image quality controls including color saturation, hue, gamma, sharpness (edge enhancement), anti-blooming and zero smearing

Ordering Information

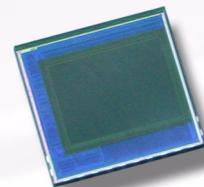
Product	Package
OV7648-K06A (Color, w/ lead)	CSP-22
OV7148-K06A (B&W w/ microlens, w/ lead)	CSP-22
OV7648-KL6A (color, lead-free)	CSP-22
OV7148-KL6A (B&W w/ microlens, lead-free)	CSP-22

Applications

- Cellular Phones
- Picture Phones
- Toys
- PC Multimedia

Key Specifications

	Array Size	640 x 480 (VGA)
Power Supply	Core	2.5VDC ± 10%
	Analog	2.5VDC ± 4%
	I/O	2.25V to 3.3V
Power Requirements	Active	40 mW (30 fps, including I/O power)
	Standby	30 µW
Temperature Range	Operation	-10°C to 70°C
	Stable Image	0°C to 50°C
	Output Formats (8-bit)	<ul style="list-style-type: none"> • YUV/YCbCr 4:2:2 • RGB 4:2:2 • Raw RGB Data
	Lens Size	1/4"
Maximum Image Transfer Rate	VGA	30 fps
	QVGA	60 fps
Sensitivity	B&W	2.20 V/Lux-sec
	Color	1.12 V/Lux-sec
	S/N Ratio	46 dB
	Dynamic Range	62 dB
	Scan Mode	Progressive/Interlaced
	Maximum Exposure Interval	523 x t _{ROW}
	Gamma Correction	0.45
	Pixel Size	5.6 µm x 5.6 µm
	Dark Current	30 mV/s
	Well Capacity	60 Ke
	Fixed Pattern Noise	< 0.03% of V _{PEAK-TO-PEAK}
	Image Area	3.6 mm x 2.7 mm
	Package Dimensions	4930 µm x 4760 µm



OV 0 7 6 4 8 - K L 6 A

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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