

**OV7640 Color CMOS VGA (640 x 480) CAMERACHIP™**  
**OV7141 B&W CMOS VGA (640 x 480) CAMERACHIP™**

### General Description

The OV7640 (color) and OV7141 (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 OV7640/OV7141 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. The OV7640/OV7141 sensor 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 etc., 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.



**Note:** The OV7640/OV7141 is available in a lead-free package.

### Features

- High sensitivity for low-light operation
- 2.5V operating voltage for embedded portable apps
- 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: Auto Exposure Control (AEC), Auto Gain Control (AGC), Auto White Balance (AWB), Auto Brightness Control (ABC), Auto Band Filter (ABF) for 60Hz noise and Auto Black-Level Calibration (ABLC)
- Image quality controls including color saturation, hue, gamma, sharpness (edge enhancement), anti-blooming and zero smearing

### Ordering Information

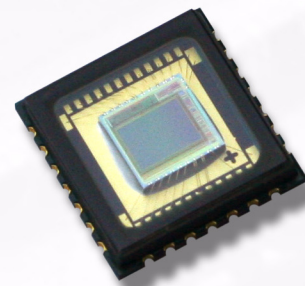
Product	Package
OV07640-C01A (Color)	CLCC-28
OV07640-P01A (Color)	PLCC-28
OV07141-C01A (B&W with microlens)	CLCC-28
OV07141-P01A (B&W with microlens)	PLCC-28

### Applications

- Cellular and Picture Phones
- Toys
- PC Multimedia

### Key Specifications

	<b>Array Size</b>	640 x 480 (VGA)
<b>Power Supply</b>	<b>Core</b>	2.5VDC ± 10%
	<b>Analog</b>	2.5VDC ± 4%
	<b>I/O</b>	2.25V to 3.3V
<b>Power Requirements</b>	<b>Active</b>	40 mW (30 fps, including I/O power)
	<b>Standby</b>	30 µW
<b>Temperature Range</b>	<b>Operation</b>	-10°C to 70°C
	<b>Stable Image</b>	0°C to 50°C
	<b>Output Formats (8-bit)</b>	<ul style="list-style-type: none"> <li>• YUV/YCbCr 4:2:2</li> <li>• RGB 4:2:2</li> <li>• Raw RGB Data</li> </ul>
	<b>Lens Size</b>	1/4"
<b>Maximum Image Transfer Rate</b>	<b>VGA</b>	30 fps
	<b>QVGA</b>	60 fps
<b>Sensitivity</b>	<b>B&amp;W</b>	3.0 V/Lux-sec
	<b>Color</b>	1.12 V/Lux-sec
	<b>S/N Ratio</b>	46 dB
	<b>Dynamic Range</b>	62 dB
	<b>Scan Mode</b>	Progressive/Interlaced
	<b>Maximum Exposure Interval</b>	523 x t <sub>ROW</sub>
	<b>Gamma Correction</b>	0.45
	<b>Pixel Size</b>	5.6 µm x 5.6 µm
	<b>Dark Current</b>	30 mV/s
	<b>Well Capacity</b>	60 Ke
	<b>Fixed Pattern Noise</b>	< 0.03% of V <sub>PEAK-TO-PEAK</sub>
	<b>Image Area</b>	3.6 mm x 2.7 mm
	<b>Package Dimensions</b>	11.43 mm x 11.43 mm



OV 0 7 6 4 0 - C 0 1 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

[www.ovt.com](http://www.ovt.com)

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