SANYO

PRODUCT INFORMATION

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CCD Camera Chip Set for Portable Equipment Developed

Reduced power consumption and the industry's lowest drive voltage achieved

LC99262GL, LC89904V, LC99503/502

Overview

Since it is now possible and useful for portable equipment to provide image-handling functionality, we expect the needs for embedded cameras to grow in the near future. In particular, since data communication capacities are increasing rapidly, there are now stronger incentives to, for example, develop a portable TV telephone by incorporating a camera in a cellular telephone. Due to these directions in the portable equipment market, there are now strong demands for lower costs, further miniaturization, and reduced power consumption in digital camera systems.

To respond to these needs, Sanyo has developed a CCD digital camera system IC chip set, consisting of LC99262GL, LC89904V, and LC99503/502, that is optimal for this rapidly expanding portable equipment market.

The LC99262GL is a 1/5-inch 330,000-pixel (VGA) CCD that supports both progressive scan and interlaced scan readout. It is provided in a newly-developed miniature leadless package that allows reflow soldering to be used for mounting.

The LC89904V is a vertical driver that includes an on-chip voltage step-up circuit that provides the +8 V and –6 V levels required for CCD drive.

The LC99503 and LC99502 are CCD controller/signal-processing ICs. The LC99503 is a high-end device that provides two-dimensional outline correction and wide dynamic range signal-processing functions, whereas the LC99502 is a low-cost low-power device.

This chip set features the ability to operate from a single-voltage power supply with the industry's lowest supply voltage (+3.3 V) for this type of system. Furthermore, it includes a power management function that can set each functional block in the system to standby mode independently, and thus achieves reduced power consumption. Image quality is improved by achieving smearless imaging by combining a newly-developed CCD drive technique with digital signal-processing technology to eliminate the smear phenomenon (residual images above or below the actual image) that occurs due to imaging conditions such as intense or high-contrast illumination. As a camera system, this chip set

provides functions for image readout using a discontinuous and asynchronous clock to take full advantage of the frame transfer (FT) CCD used. Thus this chip set is optimal for use in portable equipment.

Features

- Implements a VGA color digital camera that operates from a single +3.3 V power supply.
- Achieves reduced power consumption by providing advanced power management functions.
- Achieves smearless imaging by adopting a newly-developed CCD drive technique and digital signal processing.
- End product camera systems can be implemented easily using the image readout function that uses a discontinuous and asynchronous clock to take full advantage of the frame transfer (FT) CCD used.
- Adopts the newly-developed miniature LCC package (LC99262GL).

Specifications

LC99262GL (CCD)

- 1/5-inch color VGA (effective pixels: 652 × 486)
- Supports both progressive scan and interlaced scan.
- Vertical drive uses six independent phases for smearless imaging and an expanded dynamic range.
- Allows the use of reflow soldering for mounting in end product manufacture.
- Package: LLC miniature leadless package (size: 8.2 × 8.8 mm)

LC89904V (vertical driver)

- On-chip voltage step-up circuit
- Generates the +8 V and –6 V levels required for CCD drive from a single 3.3 V power supply.
- Package: SQFP-48 (size including pins: 9.0 × 9.0 mm)

LC99503/502 (CCD controller/signal-processing IC)

- +3.3 V single-voltage power supply
- CCD drive pulse generating circuit
- CDS, AGC, and A/D converter analog circuits
- Electronic iris, AGC, and auto white balance circuits
- Image quality control and power management functions can be controlled over an I^2C bus.
- Function for automatically writing data to an external EEPROM
- Supports full slave operation:
  Applications can read out image data with a discontinuous and asynchronous external clock.

PRODUCT INFORMATION

- Provides 8-bit YUV data output and can support ITU R.656.
- Two-dimensional outline correction function (LC99503)
- Wide dynamic range signal-processing function (LC99503)
- Package: SQFP-64 (size including pins: 12.0 × 12.0 mm)

Sample Availability

This chip set (the LC99262GL CCD, the LC89904V vertical driver, and the LC99503/502 CCD controller) will be available in sample quantities in mid-February 2000, and in production quantities (50,000 sets per month) in July 2000.

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