



FOR IMMEDIATE RELEASE

EPSON BEGINS VOLUME PRODUCTION OF S1D13L04 DISPLAY CONTROLLER FOR HIGH-RESOLUTION COLOR TFT PANELS

- Controller provides broad support for color QVGA to XGA TFT panels used in industrial equipment and medical instruments-



S1D13L04 XGA Display Controller

- TOKYO, Japan, July 25, 2016 -

Seiko Epson Corporation (TSE: 6724, "Epson") has begun volume production of S1D13L04 display controllers that support color TFT*1 liquid crystal display panels with up to XGA resolution. Epson plans to produce 20,000 units per month.

Manufacturers are increasingly demanding color TFT liquid crystal display panels for use in industrial equipment and medical instrument control panels because of their good visibility and rendering capability. Moreover, as prices for color TFT LCDs fall, they are adopting larger panel sizes and higher resolutions (e.g., XGA). In addition, low-power devices are increasingly required for mobile devices and environmentally-conscious manufacturing.

In response to these needs, Epson developed the S1D13L04. The latest addition to Epson's simple LCD controller series, the S1D13L04 is a low-cost, low-power solution that provides the essential functions of a display controller.

The S1D13L04, which supports panel resolutions ranging from QVGA to XGA, is ideal for displays used in industrial equipment, medical instruments, measuring equipment, office

equipment, home automation systems, and a host of other products.

The S1D13L04 uses external SDRAM as a display frame buffer and addresses up to a maximum of 16 megabytes. It is equipped with 16-bit direct/ indirect and serial interfaces which offer flexible interfacing with a CPU. Display functions include multiple windows, alpha blending*2, transparency, gamma correction*3, pseudo color expansion, mirror, and 180-degree rotation functions. Images can be displayed in the main window as well as in overlaid picture-in-picture windows (PIP1 and PIP2).

*1 A type of active-matrix liquid crystal display that uses thin-film transistors (TFTs). They are widely used for displays on products such as PCs and LCD TVs.

*2 Alpha-blending: The process of overlaying two images, each with a set transparency, to create a composite image.

*3 Gamma correction: A process for adjusting the brightness and color of images on a display.

Feature and Specifications

Key Product Features

1. Independent programmable color depth and resolution selection for main window, PIP1, and PIP2

- Color depth: 32 bpp (full color), 16 bpp, and 8 bpp
- Resolution: Up to 1024 x 768 (maximum pixels and clock frequency of 65 MHz)

2. Multiple windows (main window, PIP1, and PIP2) with overlay features. PIP2 supports alpha blending and transparencies

3. Alpha blending (PIP2) Supports constant alpha value (8-bit) or dynamic alpha value (alpha map)

4. Lookup table (LUT) for gamma correction (256 x 24 bits x 2 banks) 8-bit independent for each of RGB, main, PIP1, PIP2 selectable

5. 4-channel PWM signal output for backlight control 3 channels for RGB (brightness can fluctuate on the time axis) and 1 channel for W (brightness is fixed on the time axis)

Product Specifications

Product model number	S1D13L04
Supported resolutions	From QVGA (320×240) to XGA (1024×768)
External display buffer	External SDRAM (16-bit data bus, up to a maximum of 16 megabytes)
Display support	RGB interface (18/16-bit color TFT panel)
Display functions	Multiple window support for up to 3 layers (main, PIP1, and PIP2) Mirror and 180-degree picture rotation Alpha blending Gamma correction Pseudo color expansion Interrupt: non-display period (Vsync) maskable interrupt, delayed Vsync interrupt
CPU interface	16-bit direct/indirect interface Registers are memory-mapped - M/R# input selects between memory and register address space Serial host interface
Backlight control	4-ch PWM signal output
Operating voltage	2 power supplies PLL/OSC/COREVDD: 1.8 V and IOVDD: 3.3 V
Power consumption	Power Save mode: 12.8 mW (typical) During operation: 200 mW (typical) * Reference values when a still image is displayed on a VGA panel
GPIO (number of I/O ports)	25 max.
Package	208-pin QFP22-208 (pin pitch: 0.5 mm)

Notes:

Use the following link to see full press release:

http://global.epson.com/newsroom/2016/news_20160725.html

Please see the link below for further details about these products:

http://global.epson.com/products/semicon/products/lcd_controllers/simple_lcdc.html

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Led by the Japan-based Seiko Epson Corporation, the Epson Group comprises more than 67,000 employees in 90 companies around the world, and is proud of its contributions to the communities in which it operates and its ongoing efforts to reduce environmental impacts.

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