S1D13A04

EPSON
EXCEED YOUR VISION

S1D13A04 QVGA LCD Controller

The S1D13A04 is an LCD solution designed for seamless connection to a wide variety of microprocessors. The S1D13A04 integrates an LCD graphics controller with an embedded 160K byte SRAM display buffer. The LCD controller supports TFT and passive panel types and adds a Hardware Acceleration Engine to greatly improve screen drawing functions.

The S1D13A04 utilizes a guaranteed low-latency CPU architecture that provides support for microprocessors without READY/WAIT# handshaking signals. The 32-bit internal data path, write buffer and the Hardware Acceleration Engine provide high performance bandwidth into display memory allowing for fast display updates.

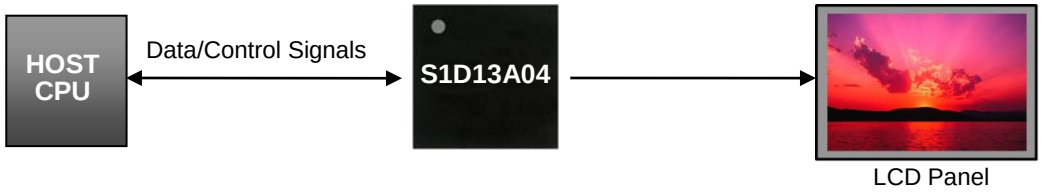
Additionally, products requiring a rotated display can take advantage of the SwivelView™ feature which provides hardware rotation of the display memory transparent to the software application. The S1D13A04 also provides support for Picture-in-Picture (a variable size Overlay window).

The S1D13A04's impartiality to CPU type or operating system makes it an ideal display solution for a wide variety of applications in embedded markets.

FEATURES

- Embedded 160KB Display Buffer
- Low Operating Voltage
- Low-latency CPU interface
- Direct support for multiple CPU types
- TFT panel support
- Passive LCD panel support
- Programmable resolutions and color depths
- USB Client, Revision 1.1 compliant
- Picture-in-Picture
- SwivelView™ (90°, 180°, 270° hardware rotation of displayed image)
- Pixel Doubling
- Hardware Acceleration Engine
- Software Initiated Power Save Mode
- Software Video Invert
- 121-pin PFBGA or TQFP15 128-pin package

SYSTEM BLOCK DIAGRAM



S1D13A04 Features

- 160 KB SRAM
- Hardware Acceleration Engine
- SwivelView Hardware Rotation
- Picture-in-Picture Overlay Window
- Double Buffering
- Pixel Doubling

S1D13A04

DESCRIPTION

Display Buffer

- Embedded 160K byte SRAM display buffer

CPU Interface

- Fixed low-latency CPU access times
- Direct support for a variety of popular interfaces

Display Support

- 1/2/4/8/16 bit-per-pixel (bpp) support
- Up to 64 gray shades on monochrome passive panels
- 9/12/18-bit TFT interface
- Single-panel, single-drive passive displays
  - 4/8-bit monochrome LCD interface
  - 4/8/16-bit color passive LCD interface
- Typical resolutions supported:
  - 320x320 @ 8 bpp
  - 320x240 @ 16 bpp
  - 160x160 @ 16 bpp (2 pages)
  - 160x240 @ 16 bpp

Display Features

- Picture-in-Picture: displays a variable size window overlaid over background image
- SwivelView™: hardware rotation of 90°, 180°, 270°
- Pixel Doubling: horizontal and vertical resolutions can be doubled without any additional memory
- Software video invert
- 2D BitBLT Engine:
  - Write BLT
  - Move BLT
  - Solid Fill BLT
  - Pattern Fill
  - Move BLT with Color Expansion
  - Transparent Write BLT
  - Transparent Move BLT
  - Read BLT
  - Color Expansion BLT

Miscellaneous

- USB Client, Revision 1.1 compliant
- Three independent clock inputs
- Flexible clock source selection with divides
- Software Initiated Power Save Mode
- COREVDD 2.0 ± 10% or 2.5 ± 10% volts
- IOVDD 3.0 ± 10% volts
- 121-pin PFBGA and 128-pin TQFP15

For more information on the S1D13A04 and other Epson Display Controllers, visit the Epson Global website.

https://global.epson.com/products_and_drivers/semicon/products/display_controllers/

For Sales and Technical Support, contact the Epson representative for your region.

https://global.epson.com/products_and_drivers/semicon/information/support.html