S1D13709



Embedded Memory Graphics LCD Controller

DESCRIPTIONS

The S1D13709 is a simple, multi-purpose Graphics/Text LCD Controller with 32KByte embedded SRAM display buffer which supports both TFT and STN panels. Designed as a functional replacement for the \$1D13700, the S1D13709 has a TFT interface supported up to WVGA panel. Also from software point of view, a system using STN panel designed with the S1D13700 can be easily migrate to a TFT panel system with the S1D13709 because the register set of the S1D13709 is fully compatible with the S1D13700.

The S1D13709 allows layered text and graphics, scrolling of the display in any direction, and partitioning of the display into multiple screens. It includes 32K bytes of embedded SRAM display memory which is used to store text, character codes, and bit-mapped graphics. The S1D13709 handles display controller functions including: transferring data from the controlling microprocessor to the buffer memory, reading memory data, converting data to display pixels, and generating timing signals for the LCD panel.

The S1D13709 is designed with an internal character generator which supports 160, 5x7 pixel characters in internal mask ROM (CGROM) and 64, 8x8 pixel characters in character generator RAM (CGRAM). When the CGROM is not used, up to 256, 8x16 pixel characters are supported in CGRAM.

■ FEATURES CPU Interface

- 8-bit CPU data bus interface
- Direct/Indirect address bus support

Display Support

 STN-LCD interface Display mode: 4-bit gray scale Maximum support size: 640x240 at 1 bpp 320x240 at 2 bpp

240x160 at 4 bpp

TFT-LCD interface

Display mode:

4-bit gray scale, 16 color palette

Resolutions up to:

800x480 using up-scaler

Display Features

• Gray Shade Support for:

- 1/2/4 bit-per-pixel (up to 16 gray shades)
 Text, graphics, and combined text/graphics display modes
- Three overlapping screens in graphics modeProgrammable cursor control (Hardware Cursor)
- Smooth horizontal and vertical scrolling of all or part of the display

Character ROM/RAM

160, 5x7 pixel characters in embedded mask-programmed character generator ROM Up to 256, 8x16 pixel characters in embedded character generator RAM

Up-scaler for TFT interface

Pre-programmed setting for TFT typical resolution

Software for S1D13700 can be used without re-design

Memory Interface

Embedded 32K byte SRAM display buffer

Clock

- Two terminal crystal or Single Oscillator input
- Embedded PLL to generate TFT clock

Power

- Software initiated Power Save Mode
- Low power consumption

• Flexible Power Supply configuration:

CORE_{VDD} 3.0 to 5.5 volts.

PLL_{VDD} 3.0 to 5.5 volts.

NIO_{VDD} 3.0 to 5.5 volts (LCD interface).

HIO_{VDD} 3.0 to 5.5 volts (CPU interface).

Operating Temperature Range

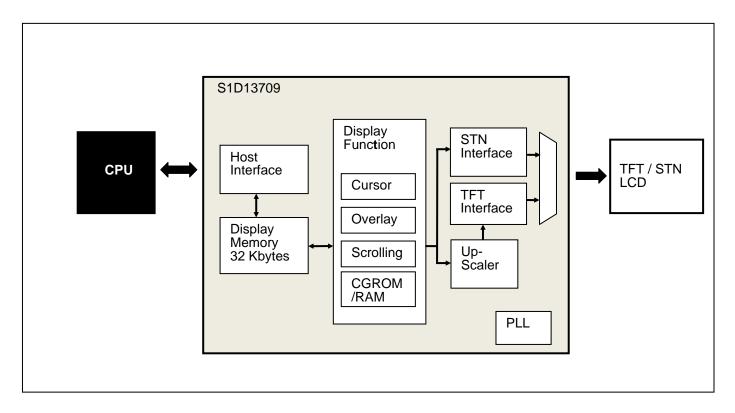
-40 ~ 85°**℃**

Package

TQFP14-80pin, 0.5mm pin pitch

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■ FUNCTIONAL BLOCK DIAGRAM



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