

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 S1D13700, 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 mode
- Programmable 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

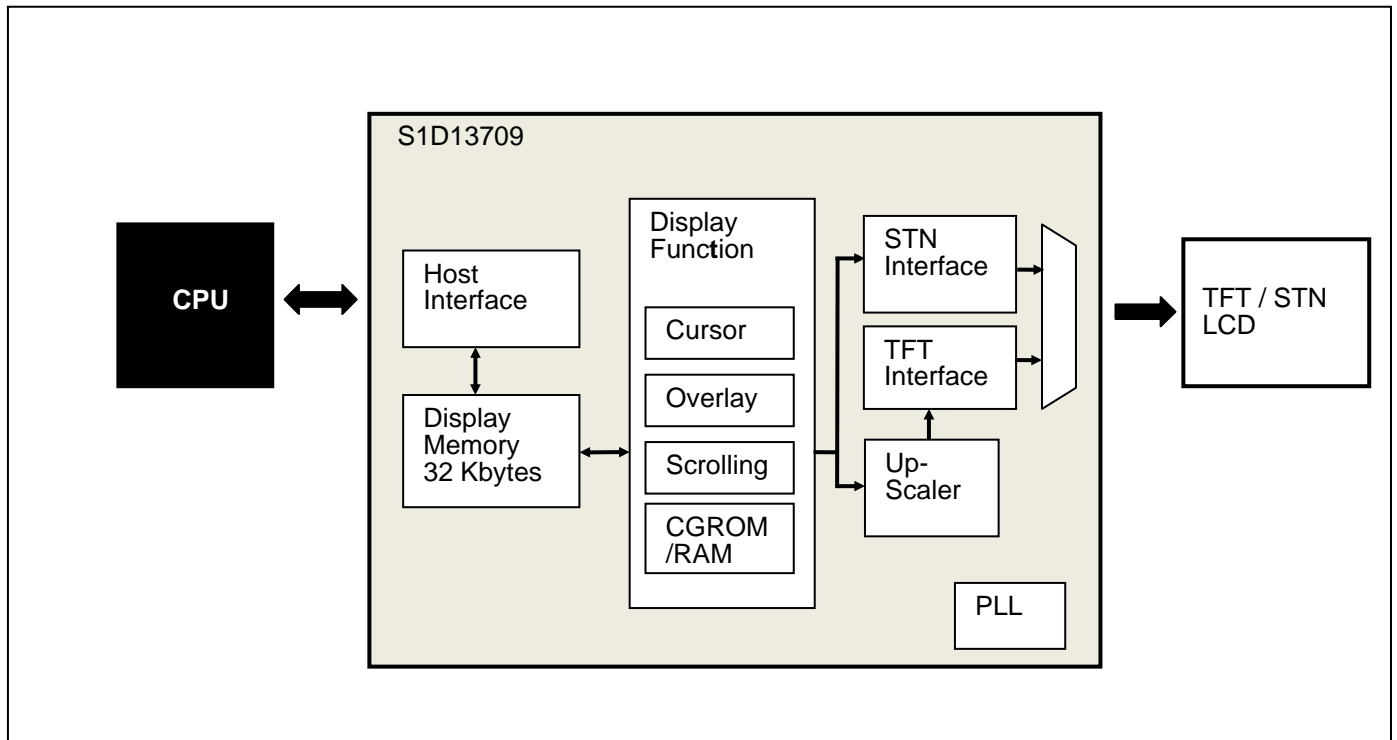
- -40 ~ 85°C

Package

- TQFP14- 80pin, 0.5mm pin pitch

S1D13709

■ FUNCTIONAL BLOCK DIAGRAM



NOTICE:

No part of this material may be reproduced or duplicated in any form or by any means without the written permission of Seiko Epson. Seiko Epson reserves the right to make changes to this material without notice. Seiko Epson does not assume any liability of any kind arising out of any inaccuracies contained in this material or due to its application or use in any product or circuit and, further, there is no representation that this material is applicable to products requiring high level reliability, such as, medical products. Moreover, no license to any intellectual property rights is granted by implication or otherwise, and there is no representation or warranty that anything made in accordance with this material will be free from any patent or copyright infringement of a third party. When exporting the products or technology described in this material, you should comply with the applicable export control laws and regulations and follow the procedures required by such laws and regulations. You are requested not to use, to resell, to export and/or to otherwise dispose of the products (and any technical information furnished, if any) for the development and/or manufacture of weapon of mass destruction or for other military purposes.

All brands or product names mentioned herein are trademarks and/or registered trademarks of their respective companies.

©Seiko Epson Corporation 2013. All rights reserved

SEIKO EPSON CORPORATION

MICRODEVICES OPERATIONS DIVISION

EPSON semiconductor website

http://www.epson.jp/device/semicon_e/

IC Sales & Marketing Department

421-8 Hino, Hino-shi, Tokyo 191-8501, JAPAN

Phone: +81-42-587-5814 FAX: +81-42-587-5117

Document code: 412602000
First issue Aug, 2013
in Japan

Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

Epson:

[S1D13709F00A100](#) [S5U13709P00C100](#)