

## S1D13L02 VGA Graphics Controller

The S1D13L02 is a low cost, low power, multi-purpose Graphics LCD Controller with 1024KByte embedded SRAM display buffer.

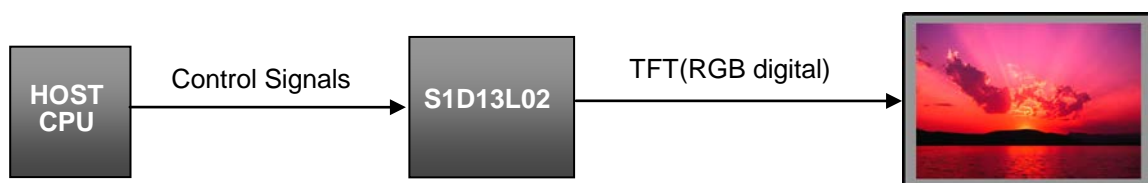
The S1D13L02 includes a pixel doubling feature which allows easy migration to larger panel sizes using existing image data such as QVGA to VGA. The feature set includes independent resizing of PIP window image data using the bi-cubic scaler and LCD output manipulation such as gamma control and optional dithering.

The S1D13L02 feature set and architecture are designed to meet the requirements of embedded systems such as Factory Automation, Medical Equipments and Office Automation applications.

### ■ FEATURES

- Embedded 1024K byte SRAM
- Low Operating Voltage
- 16-bit Indirect Host Interface
  - High Speed Host Writes
  - Rectangular, Rotated, and Mirror Host Write Modes
  - Input Formats: RGB 5:6:5
- Support for RGB Parallel I/F TFT panels
- Support for up to 3 display layers with overlay and alpha blending
  - Main Layer image can be doubled in size
  - PIP1 Layer can be resized from 8x to 1/8x
  - PIP2 Layer can be resized from 8x to 1/8x
- Look-up Table for gamma control of LCD output
- Optional dithering of LCD output
- Internal PLL or Digital Clock Input
- Software Initiated Power Save Mode
- QFP22-208pin package

### ■ SYSTEM BLOCK DIAGRAM



#### S1D13L02 Features

1024kB SRAM  
Up to 3 Display Layers  
Overlay and Alpha Blending  
Gamma Control of LCD output



# S1D13L02

## ■ DESCRIPTION

### Memory

- 1024K bytes of embedded SRAM

### CPU Interface

- 16-bit Indirect Host Interface
- Supports High Speed Host Writes
- Integrated Host interface Write Controller supports:
  - Rectangular Write Mode
  - Rotated Write Mode
  - Mirror Write Mode

### Panel Support

- 9/12/16/18/24-bit RGB interface panels

### Input Formats

- Host can input image data as:
  - RGB 5:6:5

### Display Features

- Supports up to 3 layers with Overlay and Alpha Blending functions:
  - Main Layer features:
    - Image can be stored as RGB 5:6:5
    - Pixel Doubling which doubles the size of the display image (independent horizontal/vertical)
  - PIP1 Layer features:
    - Image can be stored as RGB 5:6:5
    - Bi-Cubic Scaler can resize image from 8x - 1/8x
    - Edge Enhancement support
  - PIP2 Layer features:
    - Image can be stored as RGB 5:6:5
    - Bi-Cubic Scaler can resize image from 8x - 1/8x
    - Edge Enhancement support
    - LUT (Look-Up Table) for independent gamma control of PIP2 window
- LUT (Look-Up Table) for gamma control of the LCD output
- Optional dithering for the LCD output

### Miscellaneous

- Internal PLL or digital clock input (CLKI)
- Software initiated power save mode
- General Purpose IO pins
- CORE<sub>VDD</sub> 1.5 volts and IO<sub>VDD</sub> 1.80, 2.80, or 3.30 volts
- Packages:
  - QFP22 208-pin (28 x 28 x 1.4mm) (0.5mm pitch)

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