UC1617

Single-Chip, Ultra-Low Power
128COM x 128SEG Matrix
Passive LCD Controller-Driver

INTRODUCTION

UC1617s is an advanced high-voltage mixed-signal CMOS IC, especially designed for the display needs of low power hand-held devices.

This chip employs UltraChip's unique DCC (Direct Capacitor Coupling) driver architecture and FRM (Frame Rate Modulation) gray-shade modulation scheme to achieve near crosstalk free images, with well balanced gray shades.

In addition to low power COM and SEG drivers, UC1617s contains all necessary circuits for high-V LCD power supply, bias voltage generation, temperature compensation, timing generation and graphics data memory.

Advanced circuit design techniques are employed to minimize external component counts and reduce connector size while achieving extremely low power consumption.

MAIN APPLICATIONS

- Cellular Phones and other battery operated palm top devices or portable Instruments

FEATURE HIGHLIGHTS

- Single chip controller-driver for 128x128 matrix STN LCD with 4 gray shades and B/W Mode.
- A software-readable ID pin and an MTP programmable ID bit to support configurable vender identification.
- Partial scroll function and programmable data update window to support flexible manipulation of screen data.
- Support both row ordered and page_c (page column) ordered display buffer RAM access.
- Support industry standard 2-wire, 3-wire, 4-wire serial buses (I^2C, S8, S9) and 8-bit parallel buses (8080 or 6800).
- Special driver structure and gray shade modulation scheme. Consistent low power consumption under all display patterns.
- Fully programmable Mux Rate, partial display window, Bias Ratio and Line Rate allow many flexible power management options.
- Four software programmable frame rates up to 201Hz. Support the use of fast Liquid Crystal material for speedy LCD response.
- Software programmable 4 temperature compensation coefficients.
- On-chip Power-ON Reset and Software RESET command, make RST pin optional.
- Self-configuring 9x charge pump with on-chip pumping capacitors. Only 3 external capacitors are required to operate.
- Flexible data addressing/mapping schemes to support wide ranges of software models and LCD layout placements.
- Very low pin count (9~10 pins with S8, S9, or I^2C) allows exceptional image quality in COG format on conventional ITO glass.
- Many on-chip and I/O pad layout features to support optimized COG applications.
- V_{DD} (digital) range (Typ.) : 1.8V ~ 3.3V
  V_{DD} (analog) range (Typ.) : 2.7V ~ 3.3V
  LCD V_{OP} range: 6.0V ~ 15V
- Available MTP trimming support precise LCD contrast matching.
- Available in gold bump dies
  Bump pitch: 26.5 μM
  Bump gap: 12 μM
  Bump surface: 2,001 μM^2

ORDERING INFORMATION

Part Number	MTP	I^2C	Description
UC1617sGAA	Yes	Yes	Gold bumped die
UC1617sGAA-2	Yes	Yes	Gold bumped die, Bump Height 12uM

General Notes

APPLICATION INFORMATION

For improved readability, the specification contains many application data points. When application information is given, it is advisory and does not form part of the specification for the device.

BARE DIE DISCLAIMER

All die are tested and are guaranteed to comply with all data sheet limits up to the point of wafer sawing. There is no post waffle saw/pack testing performed on individual die. Although the latest processes are utilized for wafer sawing and die pick-&-place into waffle pack carriers, UltraChip has no control of third party procedures in the handling, packing or assembly of the die. Accordingly, it is the responsibility of the customer to test and qualify their applications in which the die is to be used. UltraChip assumes no liability for device functionality or performance of the die or systems after handling, packing or assembly of the die.

MTP LIGHT SENSITIVITY

The MTP memory cell is sensitive to photon excitation. Under extended exposure to strong ambient light, the MTP cells can lose its content before the specified memory retention time span. The system designer is advised to provide proper light shields to realize full MTP content retention performance.

USE OF I^2C

The implementation of I^2C is already included and tested in all silicon.

LIFE SUPPORT APPLICATIONS

These devices are not designed for use in life support appliances, or systems where malfunction of these products can reasonably be expected to result in personal injuries. Customer using or selling these products for use in such applications do so at their own risk.

CONTENT DISCLAIMER

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BLOCK DIAGRAM