UC1681s

Single-Chip, Ultra-Low Power
68COM x 294SEG Matrix
Passive Color LCD Controller-Driver

INTRODUCTION

UC1681s is an advanced high-voltage mixed-signal CMOS IC, especially designed for the display needs of ultra-low power hand-held devices.

This chip employs UltraChip's unique DCC (Direct Capacitor Coupling) driver architecture to achieve near crosstalk free images, with well balanced gray shades and vivid colors.

In addition to low power COM and SEG drivers, UC1681s contains all necessary circuits for high-V LCD power supply, bias voltage generation, 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 68x98 matrix C-STN LCD with comprehensive support for input format and color depth:
  12-bit RGB: 4K-color
  16-bit RGB: 60.5K-color (dither)
- Support video rate CSTN applications.
- Partial scroll function and programmable data update window to support flexible manipulation of screen data.
- Two ID pins plus two programmable ID flags, totally 4 software-readable ID bits, to support configurable vender identification.
- Support both row ordered and column ordered display buffer RAM access.
- Support industry standard 3-wire, 4-wire serial bus (S9, S8, S8uc) and 8-bit/4-bit parallel bus (8080 or 6800).
- Special driver structure and gray shade modulation scheme. Ultra-low power consumption under all display patterns.
- No power consumption or image quality penalty when used with video rate CSTN
- Fully programmable Mux Rate, partial display window, Bias Ratio and Line Rate allow many flexible power management options.
- Software programmable four temperature compensation coefficients.
- Self-configuring 8x charge pump with on-chip pumping capacitors
- Flexible data addressing/mapping schemes to support wide ranges of software models and LCD layout placements.
- Very low pin count (10 pins with S9) 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: 1.8V ~ 3.3V
  V_{DD} (analog) range: 2.5V ~ 3.3V
  LCD V_{OP} range: 4.8V ~ 11.8V
- MTP V_{LCD} trimming circuit to support precise LCD contrast matching
- Available in gold bump dies and COF:
  Bump pitch: 38 μM
  Bump gap: 15 μM
  Bump surface: > 2369 μM^2

BLOCK DIAGRAM