UC8230s

Single-Chip, Ultra-Low Power
240RGB x 320 Gate Matrix
Active Color LCD Controller-Driver

INTRODUCTION

The UC8230s handles 262,144 TFT colors and can drive a TFT color liquid crystal display of 240 RGB x 320 dots with an incorporated RAM compliant to graphics display of 240 RGB x 320 dots at maximum, and a 720-channel source driver outputs. The UC8230s incorporates a gate driver and a power circuit for driving liquid crystal display to drive a TFT panel with a single chip.

The UC8230s' bit-operation functions, 8/9/16/18-bit high-speed bus interface, and high-speed RAM-write functions enable efficient transfer of data and high-speed data update on a graphics RAM. The UC8230s' 6/16/18-bit RGB interface (VSYNC, HSYNC, DOTCLK, ENABLE, and DB17 to 0) and VSYNC interface (system interface + VSYNC) provide an interface for moving picture display.

With a window address function that facilitates the moving picture display in an arbitrary area and enables simultaneous display of moving pictures and the contents of the internal RAM, the UC8230s enables moving picture display not constrained by the still picture area. Accordingly, the data transmission is reduced to minimum, thereby saving power consumed by a system as a whole when displaying moving pictures.

The UC8230s supports power-saving operation up to the power supply voltage of 2.5V with a voltage follower circuit that generate voltage to drive liquid crystal. The UC8230s also incorporates 8-color display and standby functions that allow precise power control by software.

These features make this LSI the ideal solution for any medium or small-sized portable battery-driven products such as digital cellular phones supporting WWW browsers or small PDA, where long battery life and board size are major concern.

MAIN APPLICATIONS

- Cellular Phones and other battery operated hand held devices or portable Instruments.

FEATURE HIGHLIGHTS

- Liquid crystal controller/driver for 262,144 TFT-color 240RGB x 320-dot graphics display
- Single chip solution for a TFT display panel
- System interface
  - 8-/9-/16-/18-bit high-speed bus interface
  - Serial Peripheral Interface (SPI)
  - 8-bit transmission x 3 times (262k/65k color modes)
- Interface for moving picture display
  - 6-/16-/18-bit RGB interface (VSYNC, HSYNC, DOTCLK, ENABLE, DB17-0)
  - VSYNC interface (System interface + VSYNC)
- Window address function to write data to the rectangular area of RAM specified by the window address
  - Interface to facilitate moving picture display in an arbitrary area
  - Reduce data transmission by transmitting only the data for the moving picture display area
  - Simultaneous display of moving pictures and the contents of the internal RAM
- Functions for controlling abundant color displays
  - Simultaneous availability of 262,144 colors with γ-correction function
  - Line-unit vertical scrolling

- Low-power architecture: features for low-power operation
  - V_{cc} = 2.5 ~ 3.3 V (internal logic regulator power supply circuit)
  - I/OV_{CC} = 1.65 ~ 3.3V (reference voltage for interface pin input)
  - V_{D4} = 4.2 ~ 5.2 V (Source/COMH/P16V-Pump drive voltage)
  - Power saving function (standby mode etc.)
  - Partial liquid crystal drive to display two screens at arbitrary positions
  - Voltage followers for liquid crystal drive power circuit to fend off the direct current from bleeder-resistors
- Step-up circuit generating liquid crystal drive voltage up to 6-time scale
- 172,800-byte internal RAM
- Incorporated liquid crystal display driver with 720 source outputs and 320 gate outputs
- n-raster-row liquid crystal AC drive, enabling polarity inversion by every arbitrary number of raster-rows
- Internal oscillation and hardware reset
- Reversible direction of signals between RAM and source driver
- Exclusive for Cst structure

ORDERING INFORMATION

Gold Bumped Die

Part Number	MTP	Description
UC8230sGAB	Yes	Gold bumped die, with MTP function.

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 & ESD SENSITIVITY

The MTP memory cell is sensitive to photon excitation and ESD. Under extended exposure to strong ambient light, or when TST4 pin is exposed to ESD strikes, the MTP cells can lose its content before the specified memory retention time span. The system designer is advised to provide proper light & ESD shields to realize full MTP content retention performance.

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