Hitachi Releases HD66773 Single-Chip LSI as TFT Color Liquid Crystal Display System for Mobile Phones

⸺ Large 132 × 176-pixel display size and 260,000-color capability, plus low power consumption on a level with passive color liquid crystal display systems ⸺

Tokyo, June 27, 2002⸺ Hitachi, Ltd. (TSE: 6501) today announced the HD66773, featuring large-screen, multi-color display support on a single chip LSI, as a TFT color liquid crystal display system for use in digital mobile phones and similar products. Sample shipments will begin in July 2002 in Japan.

The HD66773 is a LSI for an amorphous TFT color liquid crystal display system, supporting a 132 × 176-pixel display-size --the largest class of display screen size for mobile phones. Although the number of display colors is 65,000, an on-chip hardware dither circuit enables display of up to 260,000 colors. Power consumption is 3.8mW at a 260,000-color display of similar low level as passive color liquid crystal display systems. The HD66773 is suitable for use in mobile phone systems that offer high picture quality together with low power consumption.

Recently, digital mobile phones are increasingly being used as terminals for information distribution services such as e-mail and WWW content, with widespread use of color screens for display of still images and the like. And in anticipation of various future services, including moving-picture distribution, the trend in liquid crystal panels in mobile phones is toward TFT color liquid display panels, with their superior responsiveness and high display-quality suitable for moving-picture display, instead of the passive color liquid crystal panels currently in general use. However, TFT liquid crystal panels tend to have higher power consumption than ordinary passive liquid crystal panels. There is consequently a strong demand for TFT color liquid crystal display system's LSI that will make it possible to achieve lower power consumption and lower cost for liquid crystal panels as well as offering multi-color capability.

LSIs for TFT color liquid crystal display system previously released by Hitachi are the HD66770/HD66771/HD667P00 chip-set supporting a 132 × 176-pixel display size and 65,000-color, and the HD66772/HD66774/HD6675/HD667P01 chip-set supporting a 176 × 240-pixel display size and 260,000-color. To meet the market demand for lower power consumption and lower cost, Hitachi has developed the HD66773 TFT color liquid crystal display system's LSI, supporting a 132 × 176-pixel display-size and maximum 260,000-color while achieving low power consumption on a level with a passive color liquid crystal display system.

The HD66773 supports a large display-size of 132×176 pixels and features 65,000 colors plus an on-chip hardware dither circuit that allows display of up to 260,000 colors. A 9/18-bit interface for 260,000-color liquid crystal display systems is provided in addition to the 8/16-bit interface for 65,000-color systems, allowing easy porting to the HD66773 of an existing 260,000-color liquid crystal display system using a chip-set and so on. An 8-color display mode for primary-color display is provided as a power-down function. Use of this mode, in which current dissipation is cut by halting the supply of unnecessary gradation-level power circuit during 8-color display, offers a drastic reduction in system power consumption. This has made it possible to achieve low power consumption, including the panel, on a level with passive color liquid crystal panels, 3.8 mW at a 260,000-color display and 0.9 mW at an 8-color display.

The HD66773 also incorporates a high-speed burst RAM-write function for writing to RAM, enabling processing at a maximum speed of 160Mbps (bits per second). This function makes possible large-volume data writing, such as color image data writing, and high-speed display rewriting of RAM data for performing moving-image display, enabling smooth moving-picture display to be achieved.

The COG* mounting method is supported, in which the device is directly mounted face-down on the glass, and single-chip implementation means to enable to reduce parts, resulting in lower-priced systems. With conventional chip-sets, gate drivers are mounted at the side of the glass, resulting in deviation, such as bias to the right, of the display position within the glass substrate. However, with a single chip there is no need for mounting on the side of the glass. And LSI is positioned only at the bottom of the glass, enabling the display position to be in the center of the glass, and so making it possible to reduce the glass size of a liquid crystal panel.

Hitachi plans further expansion of the product lineup in the future, including the development of products supporting even larger screen sizes.

Note: COG (Chip On Glass): A mounting method in which a chip with gold bumps is directly mounted facedown on the LCD glass substrate.

< Typical Applications >

- Mobile phones handling e-mail and WWW content services
- Mobile phones supporting high-speed data transfer (W-CDMA, GSM, etc.)

< Prices in Japan >(For Reference)

Product Code	Shipment Form	Sample Price (Yen)
HD66773 (HCD667B73BP)	Chip with gold bumps (zigzag pad arrangement)	1,500

< Specifications >

Item	Specifications
Display size	132 × 176 pixels
Display colors	• 65,000 colors • 260,000 colors: using on-chip hardware dither circuit
Number of outputs	396 source outputs, 176 gate outputs
Display RAM size	46,464 bytes
Display functions	• Window address function (rectangular RAM address area writing) • Dual-screen partial display function (screen division at arbitrary line) • 8-color display mode • γ adjustment function • Vcom amplitude adjustment function (22-step electronic control adjustment)
Bit operation functions	• Write data mask function (bit units) • Bit operation function (pixel units) • Specified color comparison drawing decision function
Liquid crystal drive duty	1/16 to 1/176 (programmable in 8-line units)
Interfaces	68-type/80-type 9/18-bit bus, 8/16-bit bus, and serial interface support
Write cycle	100 ns (3V power supply voltage)
Logic power supply voltage	1.8 V to 3.3 V
Step-up circuit	5× to 9× + polarity inversion
Liquid crystal drive voltage	Source side: 4.5 V to 5.5 V Gate side: +/-9.0 V to +/-16.5 V
Shipment form	• Chip with gold bumps (for COG mounting)