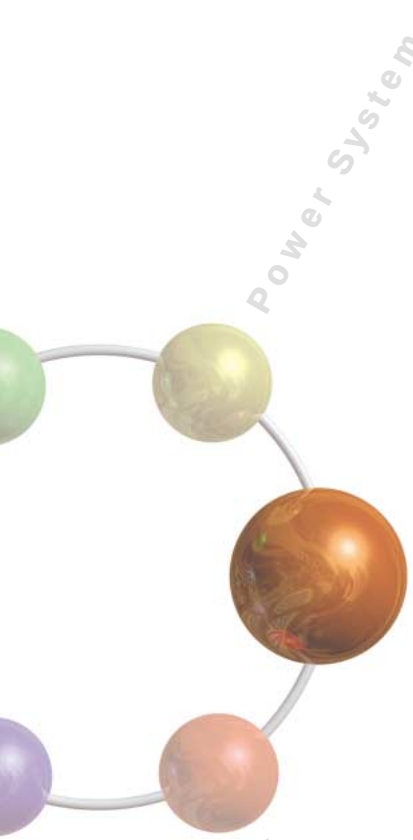


Electronics

Semiconductors

Displays

Large-capacity 1-Gbit AG-AND Flash Memory and superAND Flash Memory with Built-in Memory Management Functions

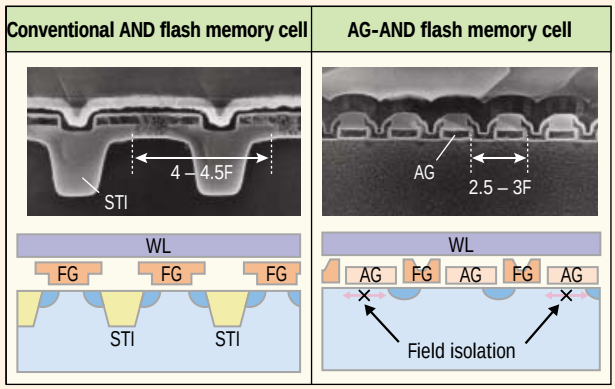
For some time now, based on its own original circuit and processing technologies Renesas Technology* has been creating AND-type flash memory products which can offer superior bit cost and easily be made to accommodate larger capacities. Now, it has developed a high-capacity, high-speed 1-Gbit product based on a new technology known as "AG-AND (assist gate-AND)."

In the case of conventional AND-type flash memory, the system did bad sector management and error bit correction, as well as equalization of the number of rewrites for flash memory. The newly developed "superAND" flash memory, however, incorporates these functions, substantially increasing ease of use. Users can thus look forward to smaller sizes and shorter development times for flash memory driver software.

In this way, rather than simply reducing the bit cost, Renesas Technology is promoting an approach based on the concept that system memory can be equated with proposals for ease of use.

Both the 1-Gbit AG-AND flash memory and the 128-Mbit superAND flash memory are currently in mass production.

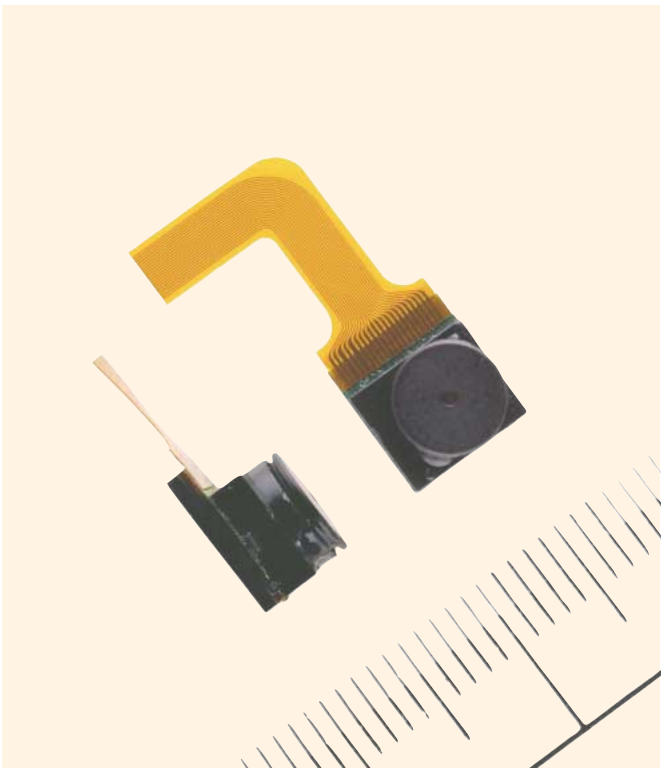
* Renesas Technology Corporation is a new semiconductor company established on April 1st, 2003 as a joint venture between Hitachi, Ltd. and Mitsubishi Electric Corporation.



WL: word line
STI: shallow trench isolation
FG: floating gate
AG: assist gate
STI and AG act as insulation between memory cells.

Structural comparison of flash memory cells

CMOS Sensor Camera Module



"HAM49002" CMOS sensor camera module

Renesas Technology has released a miniature (0.36 cm) 110,000-pixel CMOS Sensor Camera Module for use in mobile phones and mobile information terminals with camera functions.

Main features:

(1) The CMOS sensor and camera signal processing LSI have been integrated into a single compact package using high-integration module technologies, making this one of the smallest units of its kind in the industry (7.0×7.6×4.9 mm)

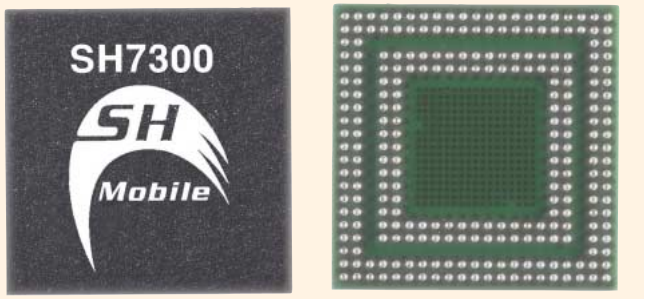
(2) Optimum parameter design of the CMOS sensor and camera signal processing LSI makes it possible to take photos when the subject's illumination is as little as 10 lx or less.

(3) A built-in 16-bit microcomputer in the camera signal processing LSI makes it possible to accommodate exposure control and a range of other complex and diverse image adjustment functions, and enables smooth image processing adapted to changes in the scene being photographed.

“SH-Mobile Series” Mobile Application Processor

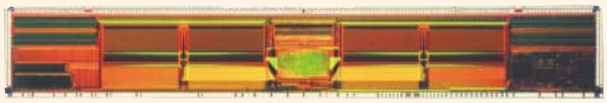
In recent years, as mobile phones are equipped with increasingly advanced functions (voice, still images, video processing, etc.), it is becoming impossible to execute the necessary processing using existing communication LSIs alone. There is an increasing demand for specialized processors designed to handle such high-level applications.

Renesas Technology has thus released the “SH-Mobile1,” the “SH-MobileJ,” and the “SH-MobileV” as part of the “SH-Mobile Series” of application processors for next-generation mobile phones. The “SH-MobileV” in particular was developed as an advanced product with exceptional video functions, with a view to the coming evolution of videophone systems.



External view of the SH-MobileV (SH7300)

Single-chip Display System Drives Main and Sub TFT Liquid Crystal Panels



The HD66777 chip for implementing dual TFT liquid crystal display systems measures 19.97 × 3.17 mm.

Renesas Technology released the HD66777, a single-chip implementation that drives an amorphous TFT color liquid crystal display system for camera-mounted mobile phones featuring dual main and sub liquid crystal panels.

The single-chip part supports a 262,000-color display, and simultaneously drives both a main LC panel (132×176 pixels) and sub LC panel (132×96 pixels). Implementing the driver as a single chip permits the mounting area to be halved and external parts to be shared, thus making it possible to halve the number of parts and create a smaller, thinner liquid crystal panel module while cutting the module cost by approximately 25%. The HD66777 also includes moving-picture application support functions such as alpha-blending for transparent display of a background screen, and on-screen display that simplifies text and icon display in moving-image data, allowing easy moving-image data processing.

(Release date: March 2003)

54-cm (21.3-inch) UXGA Super TFT-LCD Module for Monitor Use

The trend in the PC market is creating a demand for LCD monitors with larger display size and higher resolution. Demand for higher brightness LCD monitors is also strong. To meet these demands, Hitachi has introduced a 54-cm (21.3-inch) UXGA (ultra-extended graphics array) TFT-LCD module adopting a high-aperture-ratio technology [AS-IPS (Advanced S-IPS: super in-plane switching) mode] in addition to the existing super-wide-viewing-angle technology S-IPS mode. Despite its large size, the module is thin and has a narrow frame.

The module adopts technologies, such as high-color-purity color filters, that achieve 100% compliance with European Broadcasting Union (EBU) standards and produce a high-brightness backlight.

Main specifications:

(1) Number of pixels: 1,600 (horizontal) ×1,200 (vertical)

(2) Brightness: 250 cd/m^2

(3) Color reproductivity: 100% EBU (72%)

(4) Viewing angle (contrast ratio>10): over 170 degrees (vertically and horizontally)

(5) External dimensions: 460.6 (width) ×362 (height) × 25(thickness) mm

(6) Weight: 3,500 g

(Released in December, 2002)

54-cm (21.3-inch) UXGA Super TFT-LCD Module

5.6-cm (2.2-inch) QVGA Low-temperature Poly-silicon TFT-LCD for Mobile Phones

5.6-cm (2.2-inch) QVGA low-temperature poly-Si TFT-LCD

By offering Internet access and a built-in camera, mobile phones have evolved into mobile Internet terminals. As much higher grade color images, including photographs, are expected in the future, mobile phones with high-quality displays will be demanded. Accordingly, Hitachi has developed a 5.6-cm (2.2-inch) quarter video graphics array (QVGA) low-temperature poly-silicon TFT-LCD, named “HITACHI SUPER FINE COLOR.”

The integration of RGB control circuits (RGB switching circuits) has reduced the number of connections to drain drivers to 1/3 and realized a high resolution of 180 ppi. In addition, 260,000 display colors enable true color reproduction. The transflective LCD, which has both transmissive and reflective features, offers excellent visibility both outdoors and indoors. And integration of gate driver circuits has realized a narrower frame and better lateral symmetry.

Main specifications:

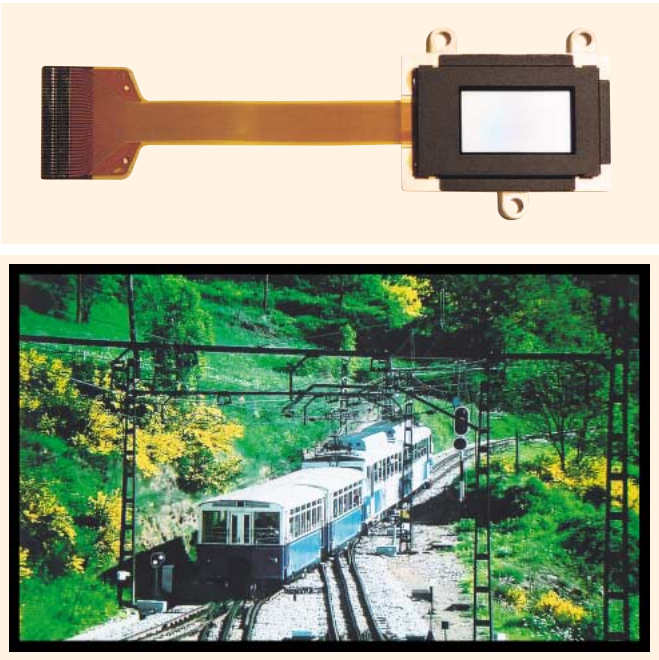
(1) Number of pixels: 240 RGB (horizontal) ×320 (vertical)

(2) Dot pitch: 0.047 (horizontal) ×0.141 (vertical) (mm)

(3) Drain driver: HD66776 (low-temperature poly-silicon TFT use only, CPU and digital RGB interface support)

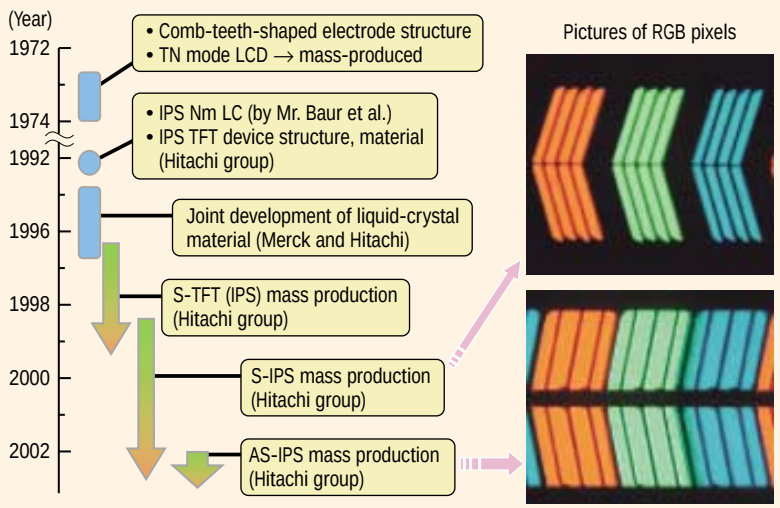
1.8-cm (0.7-inch) HDTV LCOS LCD Module for Projectors and Rear-projection TVs

With the popularity of digital broadcasting increasing, demands for large-screen TVs and realism are growing. To meet the demands, Hitachi has developed LCOS (Liquid Crystal on Silicon) LCD modules which are capable of 1080P wide-screen HDTV for use in video projectors and rear projection televisions.
Utilizing an electrode formed on a CMOS circuit as a reflecting mirror, and by combining twisted nematic (TN) liquid crystal and electrically controlled birefringence (ECB) mode, this LCD module produces high quality images without stripes of black matrix and quick response time suitable for displaying moving images. A 1.8-cm (0.7-inch) module has 2.07 million pixels, which is the highest-level resolution in the industry and makes magnified and projected images appear realistic.
Main specifications:
(1) Number of pixels: 1,920 (horizontal) × 1,080 (vertical)
(2) Contrast ratio: ≧1,000 : 1
(3) Response time: 6 ms (tr+tf, 45°C)



External view of the 1.8-cm HDTV LCOS LCD module (top), and 150-cm (60-inch) projection screen on three-panel projector (bottom)

AP-IPS LCD



TN: twisted nematic
IPS Nm LC: in-plane switching nematic liquid crystal
TFT: thin film transistor
S-TFT: super TFT
AS-IPS: advanced super IPS
RGB: red-green-blue

Hitachi group's history of developing IPS TFT LCDs

A TFT LCD using Hitachi's industry-leading IPS mode technology offers wide viewing angle as well as excellent color reproductivity and contrast. Used in various types of products, mainly in LCD monitors, IPS mode has acquired a reputation as super-IPS (S-IPS), which offers enhanced color reproductivity and wider viewing angle.
Hitachi recently developed an AS-IPS (advanced super in-plane switching) LCD, which is a more sophisticated imaging device with higher brightness as a result of increased aperture ratio compared to that of S-IPS.
Main features:
(1) For use in LCD monitors that require a large screen, high resolution, and high performance: 21.3-inch UXGA (Ultra XGA*)
(2) For use in LCD televisions that adopt moving-image technology in addition to AS-IPS technology: 20-inch WXGA

* See "Trademarks" on page 87.