EPSON

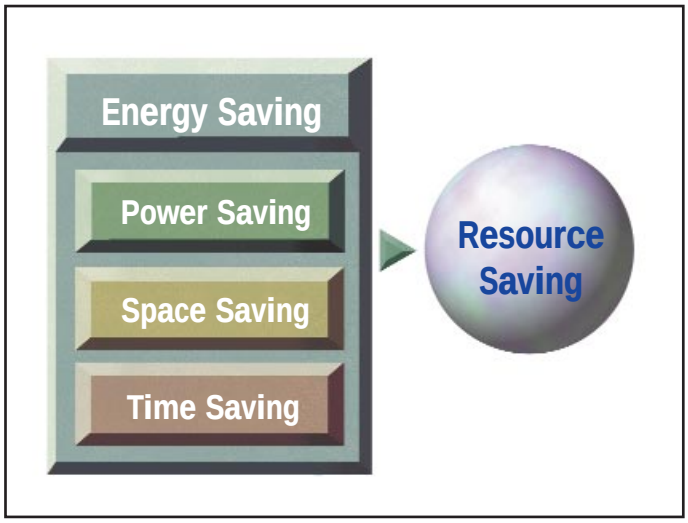
ED Newsletter 1999

Vol. 1

Dear Customers,

Mr. Yokoyama,
President of
EPSON Europe Electronics

We are pleased to introduce the “EPSON Electronic Devices Newsletter” to you. It will be published on a quarterly base and you can find our new products in it.



Ecology, economy and cutting-edge technology represent the corner-stones of EPSON’s corporate and product philosophy. In all our operations, we are aware of our responsibilities towards the environment regard no irreplaceable resources. We see harmony with Nature as a fundamental obligation in all aspects of product development work and manufacturing technologies. EPSON develops semiconductors, quartz products, LCD modules and magnets/motors based on “Saving Technologies”. The close harmony that exists between “Power Saving”, “Space Saving” and “Time Saving” provides our customers with the means to develop new products and helps save resources. The two symbols for “Energy Saving” and “Co-Existence” are an expression of our continuous commitment towards these goals.

ENERGY SAVING EPSON

EPSON’s – ecological and technical leadership!

Co-Existence EPSON

Notice Board

About the Year 2000 Problem

CMOS LSI LCD QD

The "Year 2000 (Y2K) Problem" refers to the problem occurring with the processing of the Y2K in computer systems. This "Y2K Problem" is currently being discussed as a worldwide issue.
EPSON has instigated an significant effort to ensure a thorough investigation of this problem for our products, manufacturing equipment and other areas.

Results of investigation

- EPSON Europe Electronics GmbH: We were qualified by TÜV Rheinland in March 1999 and our system will show no problems.
- Seiko EPSON Corporation: According our investigation as of January 29th, 1999, there are few problems on our products. Depending on the use of such products in conjunction with the systems, software, or circuitry of each customer, please visit our website.

New Product

Kick off Microcontroller Campaign Today: 4-bit low cost

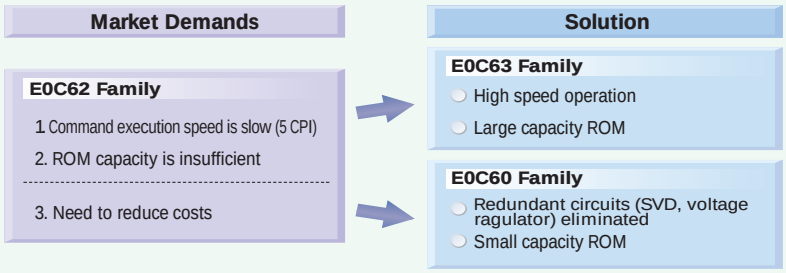
EPSON ASMIC-Campaign '99

CMOS LSI

- **During Campaign Term (15.4.1999 - 30.11.1999) following conditions are valid: Reduced Mask Charge and Free Tools !**
- **Follow up models in the E0C60 family have been released since the release of the initial models in June 1997. We would like to introduce the new models here.**

E0C60 Family Development Concept

With the E0C60 family, using our best selling E0C62 family as a base, we focused on functions for targeted applications, and aimed for even lower current consumption and better cost performance. From the planning stage, development is made to specialize the product for an application, so an optimal suitable system can be created.



E0C60 Family Product Line

Model	Application	Supply voltage (V)	Clock frequency (Hz)	ROM (bits)	RAM(bits)	Input ports	Output ports	I/O ports	LCD driver (seg. x com.)	Package
E0C6001	Clock Sports meter	1.2 to 3.6	32k	1,024x12	80x4	4	2	4	20x4	QFP12-48 pin Chip
E0C6002	Thermometer	1.2 to 3.5	32k	1,024x12	80x4	4	4	4	20x4	QFP6-60 pin Chip
E0C6003	Clock Sports meter	1.2 to 3.5	32k	768x12	64x4	4	4	0	15x4	Chip
E0C6004	Electronic money	2.7 to 3.6 4.5 to 5.5	2M	1,536x12	144x4	4	4	4	26x4	QFP12-48 pin Chip
E0C6005	Thermometer Hygrometer	1.2 to 2.0 1.8 to 3.5	32k	1,356x12	80x4	4	4	4	26x4	QFP6-60 pin Chip
E0C6006	Remote controller	2.2 to 3.5	32k 445k	2,048x12	128x4	8	4	4	20x4	QFP6-60 pin QFP13-64 pin Chip
E0C6007	Games	2.2 to 5.5	32k 2M	4,096x12	512x4	4	6	4	40x4	QFP15-100 pin Chip
E0C6008	Clock Sports meter	0.9 to 1.7 1.8 to 3.5	32k 2M	4,096x12	832x4	9	8	8	48x4	QFP15-100 pin Chip
E0C6009	Price tags	1.2 to 1.8 2.6 to 3.6	260k	1,536x12	144x4	4	4	8	38x4	Chip
E0C6011	Euro calculator	1.2~ to 1.8	32k	1,536x12	144x4	4	4	8	38x4	Chip

Device Review

"Portable" and "Display" Semiconductor Development Concept

CMOS LSI

With our semiconductor business, to realize "Energy Saving", we are advan-cing with high quality, high performance product development for low voltage operation, low power consumption pro-ducts, such as ASIC, Microcontroller, LCD Driver and memory, using our unique CMOS technology. For the development concept, we use "Portable" and "Display" as key words.

Particularly for the "Portable" field, we are focusing our efforts on the mobile communication field and portable equipment field for which market expansion is expected in the future, and we will offer a total solution which combines items including low power consumption circuit technology, processor technology (RISC core), interface technology, assembly technology and memory.

Also as we focus on display systems, with an aim to be the de facto standard in this field, we will develop not only simple LCD drivers and LCD controllers, but also ASICs with built-in LCD drivers in combination with submicron ASIC devices and Microcontrollers.

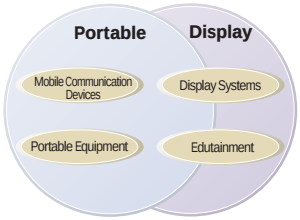
We will also attempt to make active product development in the edutainment (a term combining "education" and "entertainment") field which is expected to expand along with changes such as a decrease in the number of children.

As a base technology to achieve these, which the dual gate CMOS process as base, we are putting our effort into development of low voltage operation, low leak current process that realizes products guaranteed to operate at 0.9V. Also, using SOI technology, we will progress with development of products that aim for the "dream" of providing guaranteed operation at 0.5V.

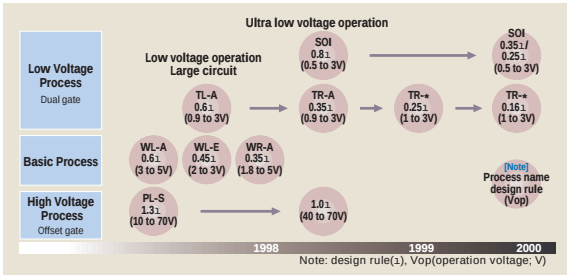
We will continue our pursuit of "Energy Saving" in the future with the keywords "Portable" and "Display", and will move forward with development of appealing semiconductor products in a way that allows us to realize "dreams" together with our customers.

* SOI: This is an abbreviation of Silicon On Insulator, and is an LSI with a structure wherein a silicon monocrystal layer is placed on an insulation film. This device attempts to reduce parasitic capacity, lower the power supply voltage, and improve operating speed.

Semiconductor Development Concept



Process Roadmap



New Product

High Performance CARD-PC "CARD-686"

CMOS LSI

We have given even greater power to the CARD-PC which realizes PC/AT functions in a credit card size. The CARD-686 is the fastest version of the CARD-PC series which uses ultra high speed CPUs. Using the system interface that is shared by the series, it is possible to easily increase the power of systems using conventional CARD-PCs.
Products are now available and we will also support it with Windows® CE.

Features

- CPU power that matches state of the personal computers for graphics
- CARD-PC series shared interface EASI (EASI = Embedded All-in-one System Interface)
- Compact size

Application

Specifications

Item	Specification
CPU	AMD-K6®
Clock	233M Hz
RAM	32MB, 64MB
Supply voltage	3.3 V and 5.0 V
External dimensions	85.6 x 54.0 x 16.75 mm

New Technology

Introducing CSP (Chip Size Package) for SRAM's

CMOS LSI

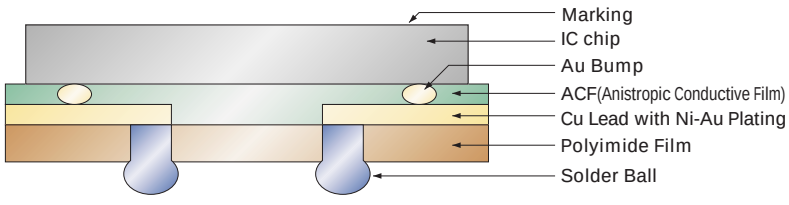
CSP is an abbreviation for Chip Size Package, and is a package where on the back surface are connected a polyimide film with solder balls for connecting a printed board as well as an IC chip, and the outside of the IC chip is solidified with resin. The mounting area is about 1/3, and the height is about 1/4 that of conventional QFP packages, and these merits are drawing attention in the portable equipment field. We have developed the CSP "TFBGA" (Tape Fine pitch Ball Grid Array) according to the strong demands from the portable equipment market, and we would like to introduce our product here.

There are two types of CSP. One is the so-called Face-up type, whereby the chip is adhered on a polyimide film, and the IC pad opening and copper pattern formed on the polyimide film are connected by bonding wire. The other is the so-called Face-down type, whereby after making electrical connections using bumps formed on the chip, sealing resin is made to flow between the chip and polyimide film.

Our TFBGA is the Face-down type, but we have improved the manufacturing method. Our manufacturing method is as follows:

(1) The polyimide film is a tape.

(2) An ACF (anisotropic conductive film) is adhered to the polyimide film, and the chip on which Au bumps are formed is thermo-compression bonded on top of that. For the ACF, conductive particles are diffused within the resin, and this functions both for electrical connection and as a sealing resin.



Cross-section diagram of Epson's CSP TFBGA (Face-down type)

For the polyimide film, a tape reel is used as the supply method, and thus productivity is increased and cost is reduced. Also, because wire reduced bonding is not used, it is possible to keep the package height at less than 1 mm, so this is a very thin type device.

TFBGA Specifications

- Ball count : 48 balls (6 x 8 rows)
- Ball pitch : 0.75mm
- Ball diameter : ø0.35mm

Applicable Products

- SRAM Products
  - SRM20W117 (64K x 16 bits) (1.8~3.0V, 120/70ns)
    External dimensions (body size): 7 x 8 x 0.9mm (typ.)
  - SRM2AW216 (128K x 16 bits) (1.8~2.8V, 100/70ns)
    External dimensions (body size): 7 x 8 x 0.9mm (typ.)
  - SRM2AW416 (256K x 16 bits) (1.8~2.8V, 100/70ns)
    External dimensions (body size): 10 x 8 x 0.9mm (typ.)
- Use for ASIC and other ICs is being studied.

New Product

Compact, Thin Type Real Time Clock Module "RTC-4574JE/SA" Released

QD

A real time clock (RTC) is an LSI Circuit which is built into cellular phones, faxes, etc., and realizes clock functions. The RTC-4574 is an RTC module which incorporates a crystal unit RTC LSI in one package.

This product is optimal for portable information equipment because it has features such as using a compact, thin SMD (surface mount) package and serial interface to meet the needs of portable equipment. We also have a product line with general use SMD packages, so the product can also be used for OA and consumer equipment.

Features

- Two type SMD packages: Compact, thin type (JE type; SSOJ-20 pin Height 1.5 mm (Max.))
  General use type (SA type; SOP-14 pin)
- Simple 3-line serial interface
- Frequency output function: Output from 32.768 kHz to 30 seconds can be selected by a internal register
  32.786 kHz output can be fixed using a pin (FCON function)
- Independent interrupt pins for alarm function and periodical output function
- Low consumption current: 0.5 µA (when 3 V; Typ.)
- Low voltage operation: 1.6 to 5.5 V

Application

JE type: Portable information equipment such as cellular phones, data banks, and digital still cameras

SA type: OA equipment such as fax machines, general consumer equipment

New Factory for Crystal Devices Built

With crystal device products, the expansion in demand is focused on information and communication equipment. To handle the demands for compact size, thinness, and high stability from the information and communication equipment market, and to make a system that provides a stable supply of products we decided to construct new factory that takes into consideration energy saving with a focus on environmental concerns at EPSON's Ina Plant.

With the new factory, we aim to achieve the same clean level as semiconductor factory and fine processing of µm unit (1/1000 mm). With the construction of the new factory, the production capacity for highly stable crystal device products is approximately 3 times that of our conventional factories.

The new factory also uses new forms of energy such as solar energy and fuel cells, using as much natural light as possible, with the goal of being an environmentally friendly factory. Using environmental policies, the energy consumption of the new factory is expected to be reduced by over 30% compared to existing factories.

Construction is scheduled to be completed in August 1999, mass production shipment is scheduled to start in November.

BVQI ISO 14001 NATIONAL ACCREDITATION OF CERTIFICATION BODIES

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