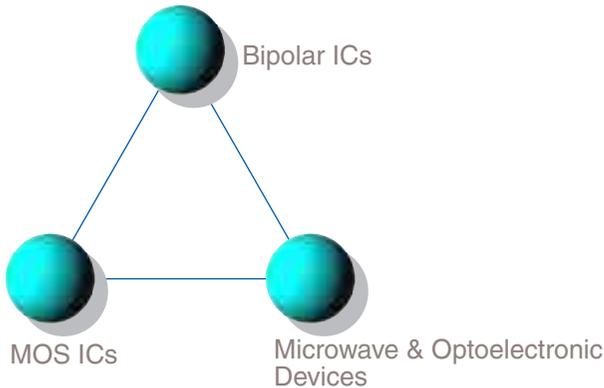


Semiconductor Devices

Products in our semiconductor devices are mostly analog semiconductors classified broadly into three groups:



These semiconductor products are handled by the following three divisions, covering product planning to designing:



Main products

- **Standard IC Division:** Operational amplifiers, comparators, power supply ICs, audio/video ICs, motor ICs. As for the operational amplifiers and comparators, we are committed to development of high-value-added products. Demands for the power supply ICs for digital AV equipment hold steady. The audio/video ICs get in great demand, from TV and audio equipment to cellular phones. The motor ICs are mainly for the PC fan motors.
- **ASSP Division:** LCD driver ICs, quartz crystal oscillation ICs, audio-related ICs, and other
- **Microwave & Optoelectronic Device Division:** Mainly, GaAs MMICs and optoelectronic devices. As for GaAs MMICs, ICs for cellular phones were main products, and as for the optoelectronic devices, the optical-noise-proof remote control receivers are main

[Business Results in fiscal 2002]

The total amount of the sales in three sections was ¥49.1 billion, up 18% from the previous year.

- **Bipolar ICs:** ¥32.5 billion. The advancement of inventory adjustment, recovering demand, and the increasing sales of new products for digital AV equipment brought about the results.
- **MOS ICs:** ¥11.7 billion, up 13% from the previous year. The sales in the fiscal 2002 slowed down due to delayed development of new products and insufficient marketing pitch. The less penetration of the high-end IC into customers seems to be a strong trigger for the results.
- **Microwave & Optoelectronic Devices:** ¥4.9 billion, up 63% from the previous year. Sales for GaAs MMICs amounted to ¥3.8 billion and those for optoelectronic devices to ¥1 billion, commanding a 90% of the domestic market. Especially, sales for GaAs MMICs increased substantially.



The NJU7043 is a dual C MOS operational amplifier capable of a full-swing input and output.



The NJW1136 is a sound processor with subwoofer output including all of functions for processing audio signal for TV.

[Product Development by division and fiscal 2003 target]

■ Standard IC Division

• Operational amplifiers and comparators

The tendency is toward a stable increase in sales based on our experience in having developing new products every about two times in these two years. The volume of the production ranks the first in Japan. We have focused on the development of not only digital products, but also new products, which brought about an increase in sales. We have also enhanced investments in personnel of the marketing and designing processes.

In fiscal 2003, we will adopt the dielectric-isolation process to ultra high-speed products in the high-value-added operational amplifiers. We will improve our line-ups of full-swing products including derivatives. In addition, we will be committed to developing and marketing high-value-added and highly profitable products, rather than conventional inexpensive products.

We will also strengthen the competitiveness in existing products cost to face competitors. We are going to enhance human resource development in the division of our time-proven analog technology, which will bring about the long-term gains of sales.

• Power supply ICs

Sales increased because we had developed new products with sophisticated features a lot, which widened the range of choices available to customers.

In fiscal 2003, we will commercialize reset ICs in a new field to gain new customers for digital applications, and put the focus on market research on the promising system power supply as an application to CMOS DC/DC converters, which is under development. In addition, we are now planning to make a foray into new fields, such as a battery charger IC.

• Audio/video ICs

Some of major TV manufacturers employed our ICs and inventory adjustment advanced, resulting in increase in sales. In particular, most audio manufacturers have employed our audio ICs. These are due largely to our customers-tailored product development.

From fiscal 2003, we will position audio processors as the leading products in the audio equipment field. Furthermore, we will commercialize an electronic volume as a product following the audio processors, and offer the electronic volume and general-purpose ICs as a chip set. In the video equipment field, we will strengthen marketing of low-voltage video amplifiers targeting the digital camera market. We will also strengthen the line-up of signal processor for TFT display by adding functions.

• Motor ICs

We positioned motor ICs for the PC fan motors.

Furthermore, we will strengthen the line-ups of motor ICs for three-phase DC motors and stepper motors to enhance a selling system by application.

Cooling motor driver ICs (5 V fan motor driver ICs) account for a 10% share of the world market. The reason is that the cooling motor drive ICs employ CMOS technology to ensure the features of low rotation noise and low current dissipation, which are not incorporated in competitors' products. In addition, we plan to come to a multi-channel market with the various drive parts of storage equipment.



The NJM2529 is a single processor for TFT display containing all functions required by color TFT signal processing.

■ ASSP Division

• LCD driver ICs and display-related ICs

Main products in this division are LCD driver ICs for cellular phones, cars and OA equipment. In the future, we will put our focus on organic EL driver ICs and white LED backlight driver ICs for color LCD to be expected for their market expansion. Specifically for the LCD driver ICs, we have finished developing 4096-color STN LCD driver ICs, and launch mass-production of them.

• Audio-related ICs

Class D amplifiers are main products in the audio-related ICs. We have developed the ICs specialized for portable audio products. It is anticipated that these ICs for MD will enjoy the No. 1 share several years after.

• Quartz crystal oscillation ICs

We are committed to development of lower-voltage and higher-frequency ICs and offer competitive ICs over other competitors' products.



The NJU6818 is a single-chip solution for driving the LCD panel with up to 80×104 pixels in 4,096 colors.

■ Microwave & Optoelectronic Device Division

• GaAs MMIC (GaAs: gallium arsenide)

We have developed devices specialized for high-frequency (microwave) ICs, and in particular, GaAs MMICs for the cellular phones are the core devices. GaAs MMICs for Front-end and antenna switching are the main devices among cellular phones in Japan. We have developed new devices for all carrier systems including W-CDMA, and the devices for this field have got boost in sales.

In addition to the cellular phone ICs, the devices for wireless LAN are also widely prevalent and increased abruptly in sales. On the other hand, we are advancing the development of new devices in accordance with the increase of PHS phones in China.

As for the optical semiconductors devices, we completed the development of optical-noise-proof remote control receivers and COBP-type microminiature photo reflectors that are new packages.

In fiscal 2003, we will focus on the development of GaAs MMICs for GSM cellular phones most widely used in the world. We have already developed devices compatible with faster wireless LAN as well as cellular phones. As for PHS phones in Chinese market, high-frequency analog switches and all-in-one ICs equipped with a receiver and transmitter are now under development and will soon be brought to the market.

In the field of optoelectronic devices, we have developed ICs for DVD pickup laser monitors, signal processing PD and promising blue laser pickup PD for the next generation.



The NJU8755 is one of the greatest stereo class-D amplifiers supporting an analog signal input.

[General overview]

Standard IC Division: For these three years, we have emphasized human resources, and increased the number of employees including new graduates hired, to try to ensure future profits. We strengthen the functions and marketing of our core products, operational amplifiers and comparators. On the other hand, we are also working on development of new product energetically to get to market with power supply ICs and new products for audio/video equipment based on our concept of new products, "to understand customer needs accurately and offer products with confidence and responsibility for customer satisfaction."

The process line at NJR Fukuoka, which will start its operation in April 2003, is expected to contribute greatly to the future increase in sales and strengthening of the production system.

ASSP Division: We will market unique ICs using our own technology as LCD driver ICs in fiscal 2003. While meeting the requirements for sub displays for cellular phones in Japan and Korea, we will introduce LCD driver ICs actively on the small color display market. We will flexibly cope with the price of CSTN to increase the sales of LCD driver ICs, whereas we will put the focus on backlight driver ICs for those other than cellular phones. As for the audio-related ICs, we will develop class D high-output amplifiers and promote its adoption to TV and home audio products. We will also actively introduce them on the piezo loudspeaker market. Since quartz crystal oscillation ICs are expected to be adopted by some major customers, we actively sell the small crystal oscillation ICs with low-voltage, high-frequency.

Microwave & Optoelectronic Devices Division: In fiscal 2003, we plan to expand our business actively based on increased sales and smooth development of new devices in the fiscal year 2002. We will improve the system for increased production by means of FAB extension, reconstruction (productive capacity, production efficiency, quality improvement, cost reduction), and capital investment. We will actively sell GaAs MMICs for cellular phones, such as above-mentioned W-CDMA, PHS phones covering the China market, and GSM, furthermore plan to sell devices for next generation-cellular phones such as 15 GHz and GPS. In the division of the optoelectronic devices, we are now developing optical sensors, BLUE PDICs and FTTH PDs.



NJL5901R is the small and thin surface mount type photo reflector including a high output infrared LED and a high sensitive Si photo transistor.



The NJG1717 is a GaAs multi-function MMIC for Japanese PHS or WLL application. The NJG1717 is operated at low voltage, and includes a low current and low distortion power amplifier, a low insertion loss antenna switch and a low noise and high gain LNA+Mixer.