

**Fujitsu Launches World's First 125°C Spec. Low Power Memory for SiPs**

*- High temperature-resistance resolves thermal and cost issues in consumer products -*

**Tokyo, May 19, 2009** - Fujitsu Microelectronics Limited today announced the launch of two new Consumer FCRAM<sup>(1)</sup> memory chips featuring an operating temperature range that has been extended to a high-temperature of 125°C for the first time in memory with a DDR SDRAM interface. Sample shipment of the two new FCRAM products, the 512Mbit (MB81EDS516545), and 256Mbit (MB81EDS256545), will begin from today. These products are low power consumption memory optimized for use in system-in-packages (SiPs) in digital consumer products such as digital TVs and digital video camcorders.

Customers will benefit from using these new FCRAM chips combined with a System-on-Chip (SoC) in a SiP configuration, in that as the temperature of the SiP rises with the increase of operating speed, the operation is not impaired or limited by the memory. Furthermore, there are the benefits of reduced development effort needed for product design, reduced board space, as well as a reduction in the number of components.

Today's digital consumer products continue to demand higher performance and faster speeds as well as low costs. To satisfy such needs, the use of SiPs, that combine for example a memory chip with a SoC, has been increasing. The use of SiPs also reduces the number of necessary components as well as reducing board space, thus helping to lower system costs. SiPs also make design easier, such as for the development of high-speed memory interfaces or for noise reduction measures.

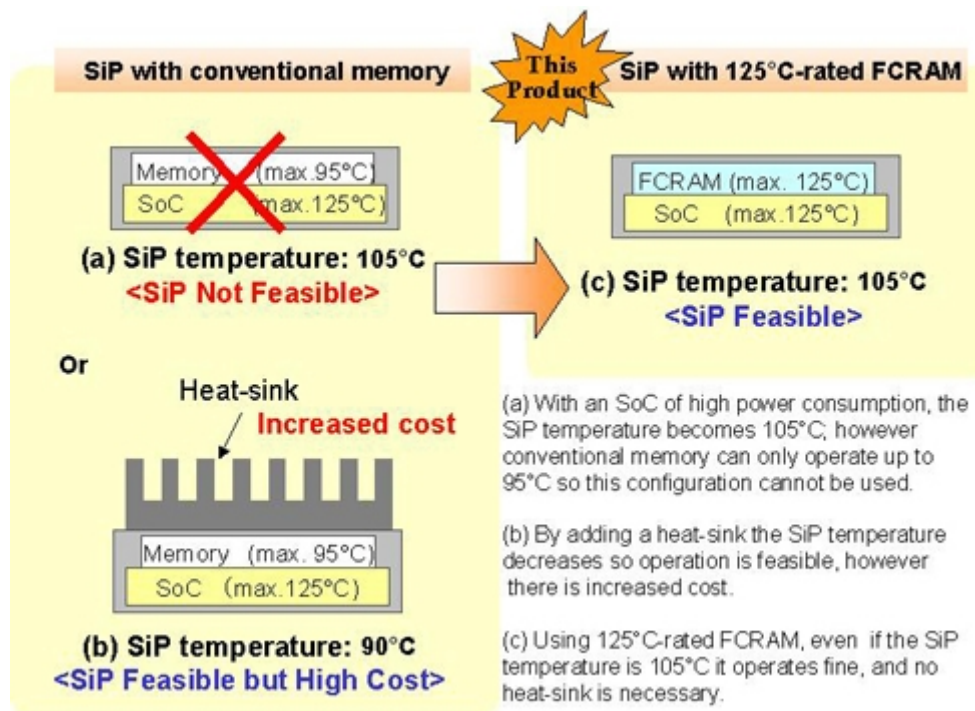


Figure 1 Options for thermal design in memory SiPs show the superiority of the new FCRAMs

As illustrated in Figure 1, up until now conventional memory has given limitations to SiP usage that are resolved with the new FCRAM products. Figure 1(a) shows a SiP configuration where a high-performance SoC has a large power consumption that generates heat such that the SiP temperature becomes 105°C. The SoC is specified to a maximum of 125°C so its operation is fine, however a conventional memory is used that can only operate up to 95°C so this SiP configuration is not usable.

To use such a conventional memory in the SiP, another option is to add some kind of heat disperser like a heat-sink. As shown in Figure 1(b), this would reduce the SiP temperature to 90°C so operating is feasible, however there is increased cost and increases size. Subsequently, many customers who have been investigating using SiPs have wished for memory with an extended operating temperature range.

Fujitsu Microelectronics has responded to those needs by developing these 512Mbit and 256Mbit Consumer FCRAM products with a maximum operating temperature of 125°C. As shown in Figure 1(c), using the 125°C rated FCRAM, the SiP operates fine even with an SoC with high power consumption, and without the need to add a heat-sink. This solves the problem of increased costs for thermal measures encountered when trying to use 95°C-rated conventional memory.

Furthermore, even for operating temperatures of 125°C, these FCRAM products can provide data transfer rates that are more than 2 times the data rate of conventional DDR SDRAM memory, while keeping power consumption low. In fact the new 512Mbit FCRAM for example can provide a reduction in power consumption of up to 50% compared to the equivalent conventional DDR2 SDRAM memory. Therefore these new FCRAMs also contribute to a 50% reduction of CO<sub>2</sub> emissions from the memory in digital consumer products.

Fujitsu Microelectronics will continue to develop products with the necessary performance and functionality for SiPs in order to provide solutions for digital consumer products with optimal value and cost

## Sample Shipment

### MB86H01 Series

Product	Part Number	Sample Availability
512Mbit FCRAM	MB81EDS516545	From May 19 2009
256Mbit FCRAM	MB81EDS256545	From May 19 2009

## Sales Target

1 million units per month in total.

## Key Features

### 1. World first operation up to 125°C

These new FCRAMs have a maximum operating temperature of 125°C, so compared to conventional SDRAM memory - with maximum temperature specifications of 85°C or 95°C - the allowable power consumption within the system is greatly increased.

Subsequently, it is possible to realize SiP solutions that were previously not possible, such as where high power consumption SoCs – needed in high-performance digital consumer electronics – combined with memory would lead to overheating. Also, it allows the use of low cost packaging that does not require high-temperature specifications.

## 2. **Low power consumption**

By expanding the bus width to 64bits and reducing the operating frequency, and with terminating resistors<sup>(2)</sup> not being required, these new FCRAMs enable a maximum of 50% reduction in power consumption compared to the equivalent system of two conventional DDR2 SDRAM memory chips with 16bit bus width. The new FCRAMs would also reduce CO<sub>2</sub> emissions attributable to memory by 50% in digital consumer products.

## 3. **High data bandwidth**

For operating temperatures of 125°C, by having a 64bit bus width and a maximum operating frequency of 200MHz, these new FCRAMs can provide a data transfer rate of 3.2Gbyte/second, which is 2 times the data rate of conventional DDR2 SDRAM memory. For operating temperatures of 105°C and below with an operating frequency of 216MHz, the data transfer rate increases to 3.46Gbyte/second.

## **Glossary and Notes**

### 1. **Consumer FCRAM:**

FCRAM(Fast Cycle Random Access Memory) is Fujitsu Microelectronics' proprietary RAM core architecture featuring high-speed and low power consumption. Consumer FCRAM refers to an FCRAM core with an industry-standard low power SDRAM interface, and which is optimized for use in digital consumer products.

### 2. **Terminating resistor:**

Resistors that are attached at the termination of a circuit wiring or a signal. They are used to prevent interference due to signal reflection, however they have high power consumption. For DDR2 SDRAM, the terminating resistors are embedded on the chip (so-called ODT: On Die Termination).

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## **Press Contact:**

Public and Investor Relations  
Fujitsu Limited

Inquiries

<https://www-s.fujitsu.com/global/news/contacts/inquiries/index.html>

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## **About Fujitsu Microelectronics (FML)**

Fujitsu Microelectronics Limited designs and manufactures semiconductors, providing highly reliable, optimal solutions and support to meet the varying needs of its customers. Products and services include ASICs/COT, ASSPs, power management ICs, and flash microcontrollers, with wide-ranging expertise focusing on imaging, wireless, automotive and security applications. Fujitsu Microelectronics also drives power efficiency and environmental initiatives. Headquartered in Tokyo, Fujitsu Microelectronics Limited was established as a subsidiary of Fujitsu Limited on March 21, 2008. Through its global sales and development network, with sites in Japan and throughout Asia, Europe, and the Americas, Fujitsu Microelectronics offers semiconductor solutions to the global marketplace. For more information: <http://jp.fujitsu.com/group/fml/en/>

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## Attachment

### Key Specifications of the 512Mbit FCRAM, MB81EDS516545

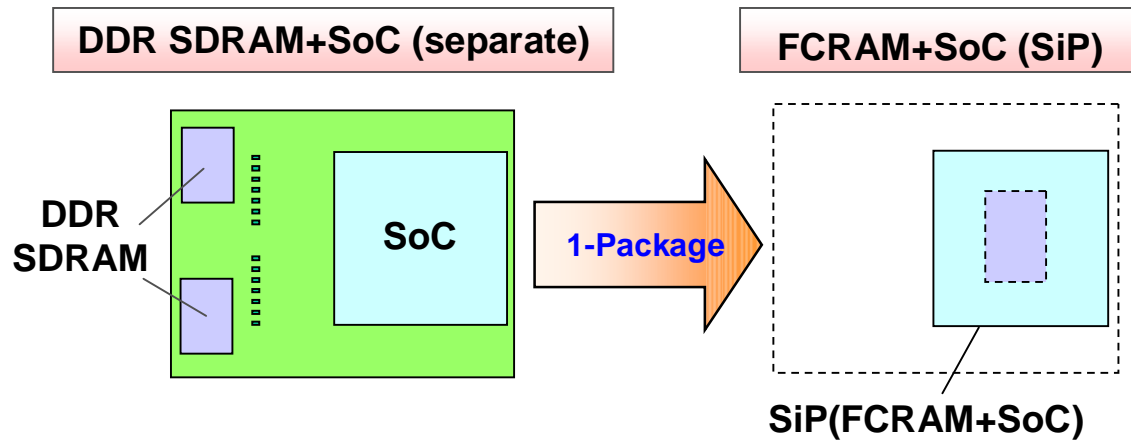
Memory Configuration	2M word x 64bit x 4 banks	
Voltage	1.7 ~ 1.9V	
Interface	Low Power DDR SDRAM (CMOS)	
Operating Temperature Range (junction temperature)	-10 ~ +125	
Burst Operating Frequency	Up to 105°C	216MHz (max.)
	Up to 125°C	200MHz (max.)
Data Transfer Rate	Up to 105°C	3.46Gbyte/sec (max.)
	Up to 125°C	3.2Gbyte/sec (max.)

### Key Specifications of the 256Mbit FCRAM, MB81EDS256545

Memory Configuration	1M word x 64bit x 4 banks	
Voltage	1.7 ~ 1.95V	
Interface	Low Power DDR SDRAM (CMOS)	
Operating Temperature Range (junction temperature)	-10 ~ +125°C	
Burst Operating Frequency	Up to 105°C	216MHz (max.)
	Up to 125°C	200MHz (max.)
Data Transfer Rate	Up to 105°C	3.46Gbyte/sec (max.)
	Up to 125°C	3.2Gbyte/sec (max.)

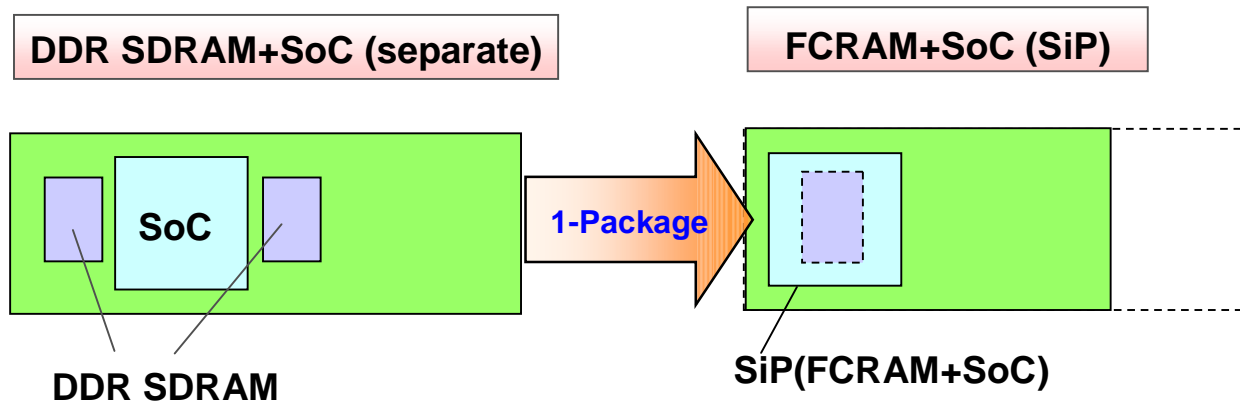
# Benefits of SiPs

## Example of SiP Solution for Digital TVs



- **Benefits:**
  - Lower costs & risks for thermal control.
  - Lowers board area reduces board cost & development risk.
  - Reduced costs due to fewer memory chips.

## Example of SiP Solution for Digital Camcorders



- **Benefits:**
  - Reduced board area increases flexibility in product design.
  - Lower board cost & development risk.
  - Lower costs due to fewer memory chips.

# Reduction of CO<sub>2</sub> emissions due to new FCRAM replacing conventional memory

■ If Fujitsu Microelectronics' new FCRAM (512Mbit product) replaces conventional DD2 SDRAM in flat-panel TVs:

- Annual CO<sub>2</sub> reduction of 14,600 tonnes\*
- Over 50% CO<sub>2</sub> reduction possible with use of new FCRAM

\* Estimation of CO<sub>2</sub> emission reduction if the FCRAM is used in 20% of the worldwide flat panel TVs to ship in 2009 (TV forecast source: DisplayResearch).

For comparison, the reduction is on the order of the yearly CO<sub>2</sub> emissions from all households in Japan (Source: National Institute for Environmental Studies of Japan, 2006 figures).

