

Stacked MCP Mounted with Two 64M-bit NOR-type Flash Memories, a 32M-bit Mobile FCRAM™, and an 8M-bit SRAM

MB84VZ064A

A quadruple-stacked MCP with the world's largest memory density, mounted with two 64M-bit NOR-type flash memories, a 32M-bit mobile FCRAM™, and an 8M-bit SRAM.

A package of the conventional size, packed with a flash memory with twice the conventional density.

Product Description

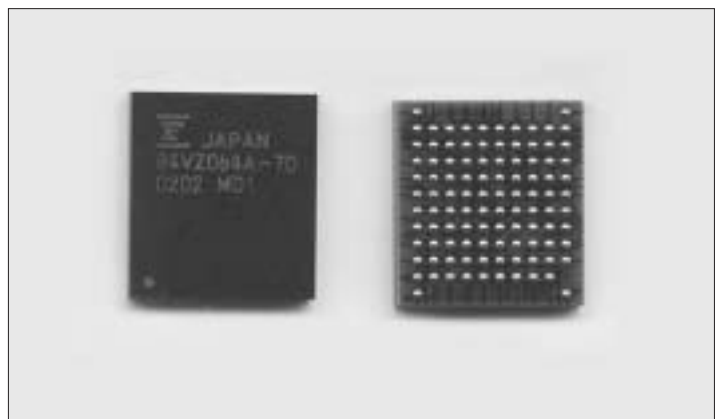
Today's cellular phones and other information devices are designed to provide an ever growing range of services and functions. Besides straight voice communication, consumers can use them to send e-mail, download images, and browse web pages. Recently, a game which can be downloaded by cellular phone is equipped with Java.

FUJITSU has already commercialized a series of stacked MCPs that combine NOR-type flash memory with SRAM or mobile FCRAM*1*2, and this hardware is widely used in mobile information devices. But with the commercial launch of the next generation mobile communication system IMT-2000*3, the wider scope of services now available to consumers is driving up demand for further enhancements in the densities and speed of cellular phones, as well for lower power consumption and cheaper memory. To respond to these market demands, FUJITSU has developed the MB84VZ064A, a quadruple-stacked multi-chip package (MCP) mounted

with two 64M-bit NOR-type flash memories, a 32M-bit mobile FCRAM, and an 8M-bit SRAM.

In today's MCPs for cellular phones, a NOR-type flash memory is mounted for program storage and an SRAM or

Photo 1 External View



mobile FCRAM is mounted for temporary storage while data is being rewritten. In addition to these components, the next generation of cellular phones will require an area for large-density data processing for sounds and video images. The MB84VZ064A provides the memory required for a cellular phone in a single package by fitting the package with two 64M-bit flash memories for program storage, a 32M-bit mobile FCRAM for application work memory, and an 8M-bit SRAM for base band work memory. The MB84VZ064A offers an optimal solution for cellular phone memory that enables the design of lighter-weight, further-miniaturized, faster circuitry for incorporation in our customer systems.

But with today's flip-chip technology this is no longer the case. In our newer devices, we can mount two or more conventionally used chips into a package of the conventional size, while increasing memory density at the same time.

Product Features

Mounting Two Chips with Identical Densities

In conventional stacked MCP's, the mounting of two chips with identical densities was an insurmountable challenge.

Figure 1 Section Diagram of 4-Chip Stacked MCP

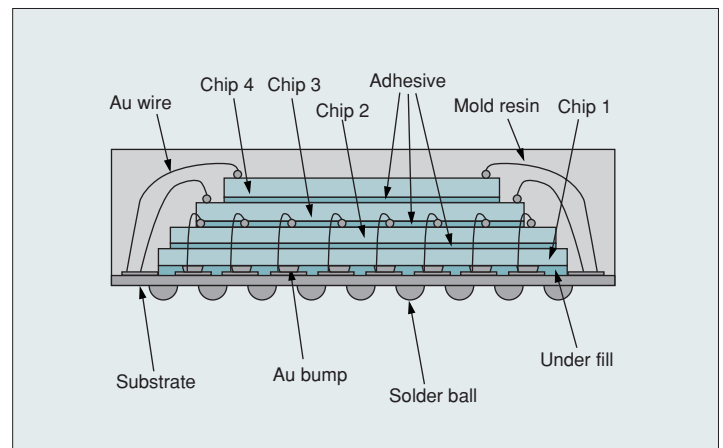


Table 1 Main Characteristics

Item		MB84VZ064A
Mounted device		64M-bit NOR-type flash memory×2 32M-bit mobile FCRAM (second-generation product) 8M-bit SRAM
I/O configuration		×16
Power supply voltage		2.7 to 3.1V
Operation temperature		-30 to +85°C
Read cycle time		Flash : 70ns/FCRAM : 70ns/SRAM : 70ns
Write cycle time		Flash : 70ns/FCRAM : 70ns/SRAM : 70ns
/CE access time		Flash : 70ns/FCRAM : 70ns/SRAM : 70ns
Flash power consumption	During operation	18mA (Max.)
	While writing	53mA (Max.)
	While erasing	35mA (Max.)
	During standby	5μA (Max.)
FCRAM power consumption	During operation	30mA (Max.)
	During standby	100μA (Max.)
	During power down	10μA (Max.)
SRAM power consumption	During operation	50mA (Max.)
	During standby	15μA (Max.)
Erase time (typical)		1.0s/sector (Max.)
Write time (typical)	Word	12μs
Package size		10mm×9mm×1.4 (t) mm
Ball quantity	Signal	96
	Circumference	7

■ Combination Most Suitable for Memory Density Increase

Conventional MCPs combine two packages-one mounted with flash memory+mobile FCRAM, and the other mounted with flash memory+SRAM. The MB84VZ064A uses a more complicated combination of flash memory+flash memory+mobile FCRAM+SRAM. By increasing the flash memory density for program storage, we can combine memories suitable for memory density increased by multi-functionality.

■ 4-Chip Multi-Layered Mounting Height 1.4mm(Max.)

Stacked MCPs tend to increase in package height as they stack more chips. The same cannot be said of the MB84VZ064A. With the use of a thin wafer back-grinding technology, the wafer height is reduced by 30%. The

thickness of package realizes 1.4mm, which is almost the same package height as TSOP. Restrictions of the mounting height of substrate are reduced, and a more flexible design is attained.

■ A New Type of Memory Element that Provides Faster Speed

- Access Time: 70ns (Flash, mobile FCRAM)
- Erase Time: 0.2s / sector (Typical), 1s / sector (Max.)

■ Small Package

- Package: FBGA^{*4}-103 ball (Signal ball, 96; reinforcement ball, 7)
 - Size: 10.0mm×9.0mm×1.4 (t)mm
- Compared to the area of the conventional MCP (64M-bit

Figure 2 Pin Assignment

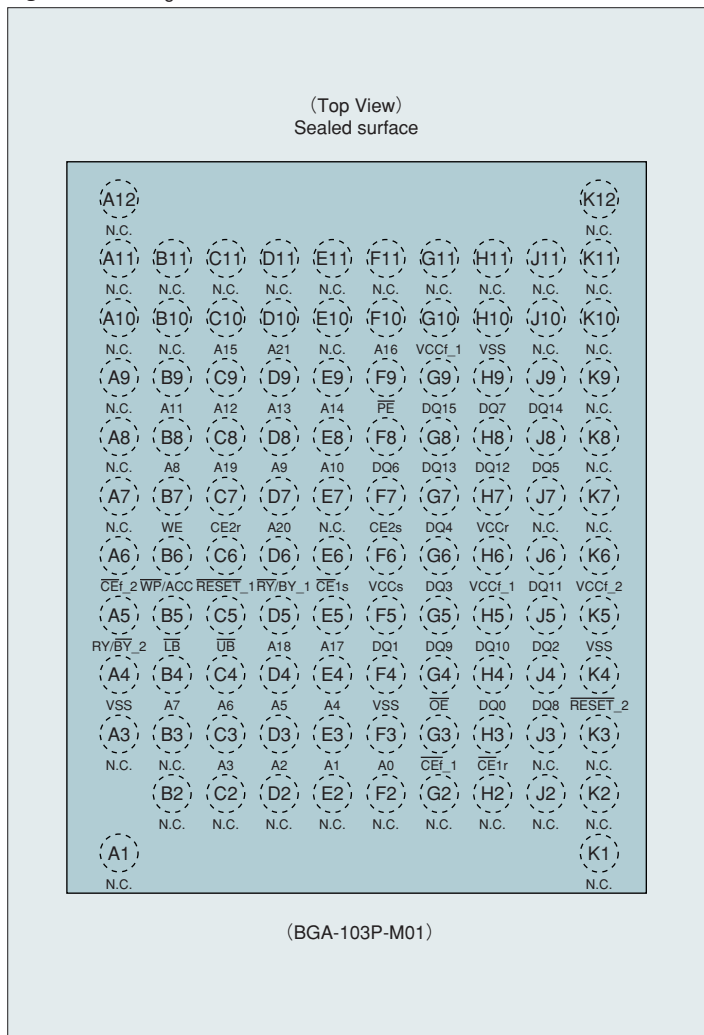
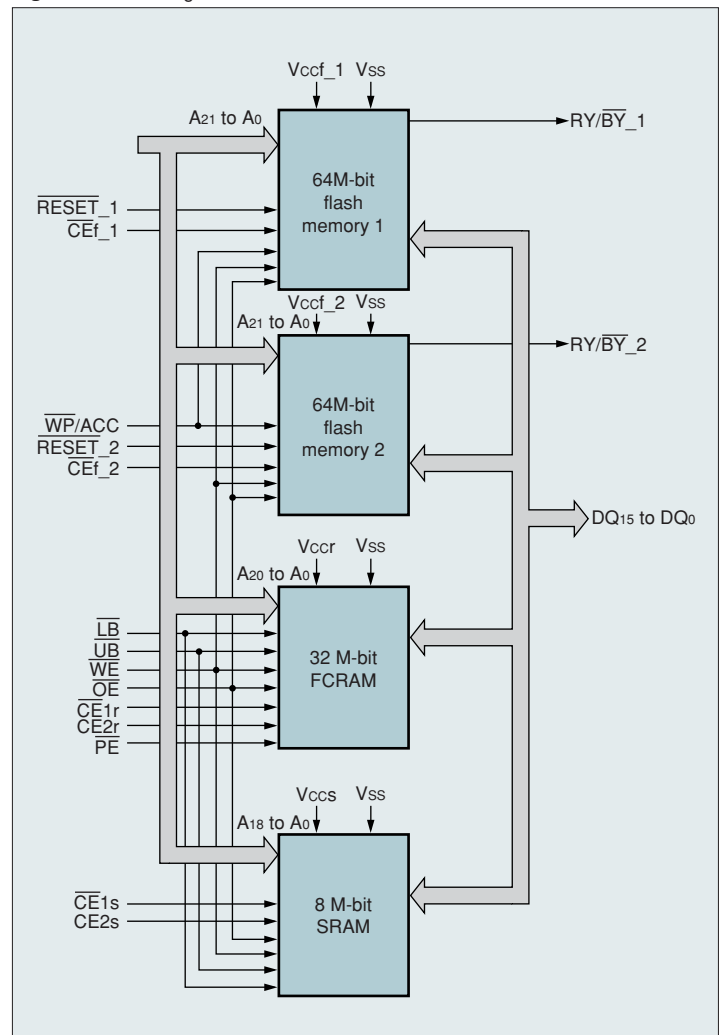


Figure 3 Block Diagram



NOR-type flash memory+32M-bit mobile FCRAM and 64M-bit NOR-type flash memory+8M-bit SRAM, area: 193.32mm², the new device is miniaturization to 90 mm² (reduction of approximately 53%).

Fig.1 shows the section diagram of 4-chip stacked MCP, Table 1 shows its main characteristics, Fig.2 shows its pin assignment, Fig.3 shows its block diagram, and Fig.4 shows the external dimension diagram of the package.

Future Development

This article has introduced the new MCP, a product designed with a large-density memory to keep up with the growing demand for mobile devices with higher functions.

By MB84VZ064A, MCP corresponding to each function of a cellular phone can be chosen. FUJITSU will continue

to develop and provide flash memory application products that will meet the market needs. *

NOTES

- *1: FCRAM (Fast Cycle Random Access Memory): A high-speed, low-power-consumption RAM core originally developed by FUJITSU.
- *2: Mobile FCRAM: A low power pseudo-SRAM for mobile phones and terminal applications. It consists of an FCRAM core and an asynchronous SRAM interface.
- *3: IMT-2000 (International Mobile Telecommunications 2000): A standard for mobile communication systems established by the International Telecommunication Union.
- *4: FBGA (Fine-pitch Ball Grid Array): A type of surface-mountable packaging.

* FCRAM is a trademark of FUJITSU LIMITED.

Figure 4 External Dimension Diagram of the Package

