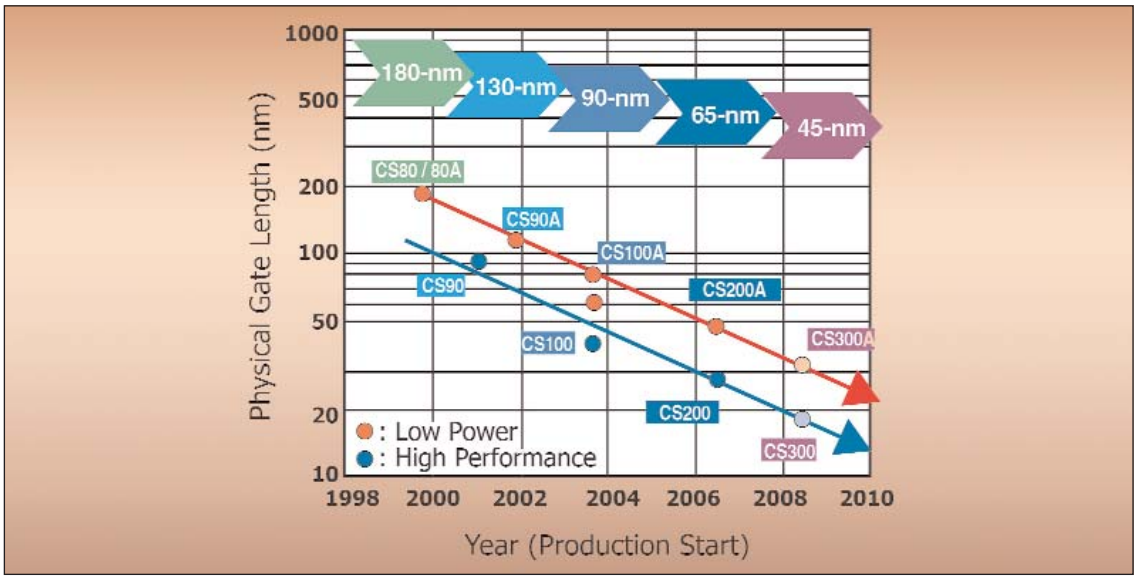
65nm CMOS Technology, CS200 / CS200A



Description

As miniaturization of silicon devices progresses, Fujitsu provides the most competitive, world-class technology to ASIC and COT customers. Fujitsu's 65nm technology has shrunk gates by 25% when compared to the 90nm technology.

Fujitsu will start tape-out acceptance for the technology in early 2006.

Features

- The 30nm long gate, only 75% the size of the CS100 transistors.
- 20 to 30% faster performance than the 90nm generation.
- Transistor density doubled compared with the 90nm generation.
- SRAM cell area reduced 50% compared with the 90nm generation.

Specifications

	65nm (CS200)	65nm (CS200A)
Gate length	30nm	50nm
Core VDD	1.0V	1.2V
Gate oxide thickness (physical)	1.1nm	1.7nm
Gate electrode	NiSi / Poly-Si	CoSi2 / Poly-Si
Source / drain electrode	NiSi	CoSi2
Interconnects	11-Cu + 1-Al	←
Metal 1 pitch	0.18µm	←
Inter-level dielectric	Porous ULK (k = 2.25)	←
Drain current enhancement	Advanced stress control	←

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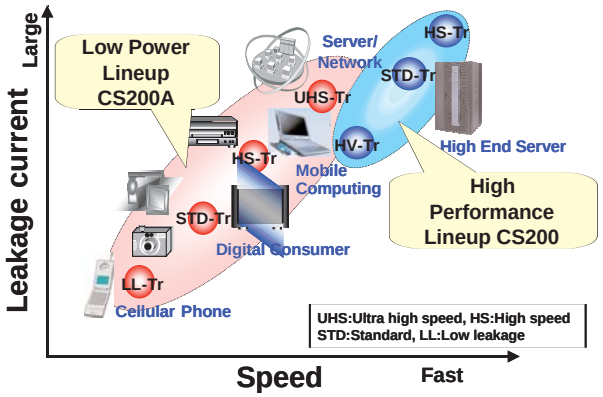
Technology Lineup



Standard		Technology families	
		CS200A	CS200
Core	Vdd	1.2V	1.0V
	UHS	x	
	HS	x	x
	STD	x	x
	LL	x	
	HVt		x
	1.8V	x	x
I/O	2.5V	x	x
	3.3V	x	
	3.3V LVt	x	
SRAM	6T Symmetry	0.535µm2	0.595µm2

Fujitsu provides two series of technology: CS200 for high-end use such as high-performance server CPU chips, and CS200A for low-power or mobile use.

The CS200A technology, in particular, provides a great variety of transistors from low-leakage (LL) for cellular phones to ultra-high-speed (UHS) for servers or network devices. Customer can mix the transistors in a chip to meet their needs.
The 65nm family consists of the low-power CS200A and the high-performance CS200, giving customers the flexibility to choose the appropriate technology to differentiate their products. The HVt (high Vth transistor) of the CS200 achieves higher performance. The I/O ranges from 1.8V to 3.3V. For the CS200A, 1.8 (2.5 or 3.3V) I/O-transistors can be embedded in a chip. The SRAM memory cell size is less than 0.6µm2.

SPICE simulations for some benchmarking circuits show that the new product is 20 to 30% faster than the previous version. The great performance improvement is a result of Fujitsu's advanced technology, which was developed for the company's high-performance servers. The chip size of the CS200 is only 60% the size of CS100, when making the same spec LSI, which is 4M gate logic and 2M gate macro. (SRAM: 0.5Mbit, PLL, etc.)

CS200 Circuit Delay Performance (ps per gate)

	CS200	CS100	Delay reduction
Inverter	5.7	7.0	77%
2-input NAND	8.7	11.4	69%
2-input NAND + 200-grid interconnect load	23.1	30.8	67%

IP Portfolio

Fujitsu's foundry services offer an extensive IP lineup, including CPU cores, image cores, encryption, interface controllers and high-speed I/O, all prepared for 65nm ASIC.

Fujitsu provides a one-stop, turnkey packaging service, which includes package design, simulation, assembly and testing. Packaging options include standard BGA and Flip-Chip BGA (FC-BGA). Fujitsu is the acknowledged global leader in advanced packaging technology, innovation, patents and manufacturing techniques.

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