Intra/Inter-Chip Wireless Interconnect System for ULSI (3)
—A CMOS Ultra wideband Receiver—

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1. Research Targets
A wireless interconnect technology has been developed and it can provide a better answer for RC delay problem in future ULSI [1,2]. Recently, UWB (Ultra Wide Band) technology has been developed for indoor communications [3,4]. However, single chip CMOS UWB integrated circuits have not been developed yet. In this study, a prototype of single-chip UWB receiver based on 0.18-µm CMOS technology has been developed based on 0.18µm CMOS technology. The target operation frequency is 4-5 GHz.

2. Research Results
Figures 1 and 2 show a photograph and block diagram of a prototype of single-chip UWB receiver based on 0.18-µm CMOS technology, respectively. It is composed of 200 prototype of single-chip UW B receiver based on 0.18-µm CMOS technology. The target operation frequency is 4-5 GHz.

3. Summary and Future Plan
A prototype of single-chip UWB receiver integrated with dipole antennas was designed based on 0.18µm CMOS technology. Small signal analyses and HSPICE simulation of CMOS UWB receiver circuit using Gaussian monocycle pulse were conducted. High frequency roll-off due to parasitics of LNA resulted in the increase of monocycle pulse width. Accordingly, the template signal should be shifted to reduce bit error rate. The results of theoretical analysis were submitted to SSDM 2004.

4. References

5. Achievement
Proceedings

Oral presentations
Fig. 1. The Photograph of UWB receiver (TSMC CMOS 0.18-µm mixed signal, $V_{dd}=1.8V$).

Fig. 2. Functional block diagram of UWB receiver.

Fig. 3. Output of UWB receiver (HSPICE simulation).

Fig. 4. Input, template and output signals of Mixer in the case of $d=1$ (left) and $d=0$ (right).

Fig. 5. Schematic diagram of differential low noise amplifier.

Fig. 6. Frequency response of LNA. (a) Voltage gain (b) Phase shift.

Fig. 7. Output signal of LNA.

Fig. 8. Frequency spectra of Input and output signals of LNA.