

A Novel On-Chip Antenna for WCAN (Wireless Chip Area Network) Applications

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Recent studies show that with the development of CMOS technology, the IC (integrated circuit) performance improvement has been focused on improving the device integration and operation speed, which makes it possible to realize the system integrated on single chip. The decrease of device dimension and increase of device speed will make the conventional hard-wire metal interconnects encounter performance limits (M. Frank Chang *et al*, *Proc. IEEE*, 89(4), 456-466, 2001). Therefore, the concepts of wireless interconnects and WCAN (Wireless Chip Area Network) have been proposed by some researchers (Y. P. Zhang, *APMC*, 2004).

In the design of a WCAN, on-chip antenna is very important to realize the desired on-chip signal transmission. Hence, many studies have been carried out on on-chip integrated antennas, including fabricating technologies and model realization (A. B. Rashid *et al*, *IEEE EDL*, 23(10), 731-733, 2002; T. Kikkawa *et al*, *IEEE, EDL*, 26(10), 767-769, 2005; Y. P. Zhang *et al*, *IEEE Trans. ED*, 52(7), 1664-1668, 2005; and B. A. Floyd *et al*, *IEEE JSSC*, 37(5), 543-552, 2002).

In this work, a novel on-chip antenna structure on silicon substrate was proposed, which can be used for wireless signal transmission. Compared to other common on-chip antennas, this antenna interference to the neighboring devices and circuits can be reduced significantly. Under such circumstances, the performance of the on-chip circuit will be improved.