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Research and Development of Analog CMOS

There was a problem with how to embed the analog part composed of bipolar elements into CMOS LSI along with its development. It became possible to structure basic analog circuits with CMOS. However, it becomes indispensable to embed the radio frequency (RF) circuit for LSI to handle radio, such as Wi-Fi including mobile phones and smartphones. In order to solve this challenge, focusing on the properties of analog circuits, it was possible to realize the broadband property with CMOS inverters and switches alone. This is further expected to develop toward the LSI (SoC) of analog – digital mix loading.

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Concept Construction and Commercialization of Artificial Retina LSI

Along with the development of LSI, demand in the image processing field increased. "Silicon Artificial Retina LSI" that mimics the function of the human eye has emerged as a device in the field of image processing. This was the image sensor with a new concept having properties such as high-speed processing/low-power consumption in addition to the simplification/downsizing of the system by means of detecting image characteristics within LSI in addition to detection done by conventional image sensors such as CMOS and CCD. Maximizing these advantages, it has been commercialized in a wide range of fields such as mobile phones, personal digital assistants (PDAs), portable game consoles, arcade games, security systems for parking lot monitoring, and traffic flow sensors.

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The World's First Commodification of High-capacity EEPROM and its Development into IC Guard Microcomputers

The current expansion of mobile devices has been remarkable. In these devices, Electrically Erasable and Programmable Read Only Memory (EEPROM) is used here and there. This EEPROM technology uses silicon film and has achieved the world's first commercialization of a 16K bit product, and further succeeded in advancing into 1M bit high-capacity memory. Furthermore, having this memory and microprocessor with built-in LSI, this led to the IC guard microcomputer.