The Situation With Semiconductors

Korea, a leader in the growing semiconductor market, is poised to expand its global presence

The global semiconductor market has been growing by more than 6.5 percent annually, from USD 231.7 billion in 2009 to USD 318.1 billion in 2013. The Korean share of the world market grew considerably, from 11.7 percent in 2009 to 16.2 percent in 2013.

The world semiconductor market is predicted to grow by an average of 8.8 percent annually to reach the size of USD 361.1 billion in 2018.

System semiconductors take up 62.5 percent of the total semiconductor market and their share is forecast to grow by an average of 2.8 percent annually by 2018.

The system semiconductor market is showing particularly high growth in the mobile area. The mobile AP, tablets are forecast to grow by 14.6 percent and 20.6 percent, respectively. The mobile AP, which is mostly used in mobile devices for data storage, and the NOR type, which is mostly used to store programs.

The system semiconductor performs operation, control, data transmission and conversion in computers, mobile devices, home appliances and the electronic modules of automobiles. It is a common name for the electronic element in the final unit of electronic products.

In addition, equipment such as the stepper & scanner, etcher, CVD, CMP and wet station is used to manufacture semiconductors while materials such as the wafer, photo resist, chemicals, gas, CMP slurry and MASK are used in the semiconductor.

Application of Next-Generation Semiconductors

Next-generation semiconductors include the advanced concept multimedia device, the multi-functional smart device, the processor/media semiconductor used in wearable devices, the highly functional communication-broadcasting convergence semiconductor integrating 3G, 3G, 4G and 5G communications, the high-reliability and high-safety automobile semiconductor operating electric and self-navigating vehicles and the power semiconductor, which performs power transmission and transformation while minimizing the leakage of electricity.

In the future, the semiconductor is predicted to evolve into the “multi-functional convergence semiconductor,” which maximizes economic efficiency, user friendliness and productivity by integrating the operation, control, transmission and conversion functions of the signal, data and energy of electrical and electronic systems into a single chip.

Semiconductor Leaders

The semiconductor industry has high entry barriers and structure in which the winner monopolizes the market and profits. In all areas of semiconductors, the top three leaders occupy most of the market share.

Qualcomm of the United States, MediaTek of Taiwan and Samsung of Korea together have a 70 percent share of the mobile phone semiconductor market while Samsung and SK Hynix of Korea and Micron of the United States have a more than 80 percent share of the memory semiconductor market. Intel and AMD of the United States have a 91 percent share of the CPU market while Infineon of Germany and TI Fairchild and STMicro of the United States have a more than 50 percent share of the analog semiconductor, automobile semiconductor and power semiconductor markets. Thus, the few leaders dominate, and market domination of the early starters and nations is expanding. TMSC and other Taiwanese companies have a more than 70 percent share of the semiconductor foundry service market. Applied Materials and LAM Research of the United States, Tokyo Electron of Japan and ASM of the Netherlands have a more than 90 percent share of the equipment/materials market.

Korea’s Semiconductor Industry

Korea is globally competitive, as the memory semiconductors manufactured by Samsung Electronics and SK Hynix take up a 52.4 percent share of the world market. They are expected to maintain their competitive edge for some time.

However, Korea does not manufacture sufficient system semiconductors to meet the country’s needs. It has a 30 percent share of the world market for mobile devices including smartphones, 50 percent of the world digital TV market and 8 percent of the world automobile market. It imports most of the semiconductors needed in them. Key semiconductors used in the baseband modem, RF IC, CPU and digital TV as well as the semiconductors used in ECU and automobiles are what Korean companies need.

Moreover, most of the semiconductor equipment needed by domestic semiconductor manufacturers must be imported. Lithography equipment, ion implanters, etc., used in the manufacture of semiconductors must also be imported.

Korean companies actively develop in global markets because it is difficult to grow in the limited Korean market with a limited number of products. China is the key overseas market. Korean companies already manufacture DRAM and NAND flash memories in China with Korean technology. In the system semiconductor area, many small fabless companies have been established and are operating local marketing bases. Semiconductor equipment and materials companies are also trying to sell their products in China directly in response to the Chinese government’s policy of developing local semiconductor production. For some time, the Chinese market will remain a very attractive one for Korean semiconductor companies.

Following China, Korean companies will strive to develop in markets including Malaysia, Indonesia, India, Vietnam and other Southeast Asian countries.