Industry Analysis

Semiconductor Developers

Q4 2013

Industry Overview

The semiconductor industry consists of manufacturers of semiconductor integrated circuits (ICs), also known as microchips. Semiconductors, in a scientific sense, are substances (usually solid elements) that can conduct electricity under some conditions, and have insulator properties. More commonly, semiconductors refer to electronic devices made from semiconductor materials, mostly silicon wafers from which many chips are made. A semiconductor device can perform the function of a vacuum tube having hundreds of times its volume. A single IC, such as a microprocessor chip for personal computers (PCs), can do the work of a set of vacuum tubes that would fill a large building and requires its own electric generating plant, not to mention frequent downtime and maintenance costs.

Semiconductors are used in many more products than just computers, although computers represented the majority of semiconductor sales as late as 1998. For 2010, computers are estimated to represent 40 percent of the semiconductor end-use market, consumer electronics 20 percent, and wireless handsets 20 percent. The remaining 20 percent was mostly from industrial and military uses, automobiles, and wired communication equipment. Semiconductors have almost become ubiquitous, with products from complex industrial machinery, to consumer electronics, to airplanes, to children’s toys, all containing semiconductors.

Latest Activity. The semiconductor industry began to rebound in 2010 after crashing during the onset of the economic crisis in late-2008, a crash in chip sales only to be outdone by the technology-implosion of 2001 and 2002. In 2009, global semiconductor sales fell 9 percent to $226 billion. The previous downturn saw revenue drop from over $200 billion in 2000 to about $140 billion in 2001 and 2002. In 2010, after a disastrous 2009, global revenue grew at an astounding 32 percent, reaching $298 billion, and all-time high. IC sales began to rebound in late-2009 and continued throughout most of 2010, but fell off a bit in the fourth quarter of 2010 on continued sluggish economic growth. Most see growth over 2010’s highs being tough for 2011, but good growth is seen in the coming years on increased demand for chips in end uses of mobile handsets, tablet PCs, and other consumer electronics.

History and Moore’s Law. In the early 1900s to 1950s, vacuum tubes were the primary electronic components of electrical products. But they were fragile, hulky, unreliable, power-hungry, and produced excessive heat. In 1948, Bell Labs invented transistors, which offered electrical functioning of vacuum tubes, but in a solid-state, which required no vacuum, and were small and low weight, had low power requirements. Instruments integrated a transistor with resistors and capacitors on a single circuit (IC). In 1971, Intel put key elements of programmable computers on a single powerful 8080 microprocessor, which led to the advent of PCs.

Underlying the persistent improvement in chip performance over the years after Dr. Gordon Moore, co-founder of Intel. In 1965, Dr. Moore noted that transistors on chips doubled every year, and predicted it will continue at he then revised his prediction to doubling transistors every two years.