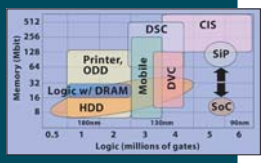
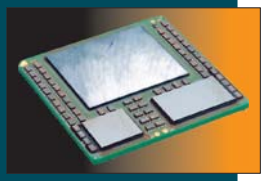
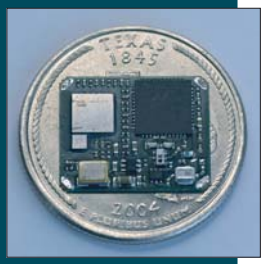
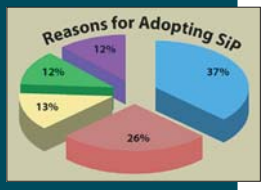
System-in-Package:
The New Wave in 3D Packaging









Technology advances and market drivers have produced a renaissance in multichip packaging solutions. System-in-Package (SiP) solutions are increasingly found in a broad range of market segments, including consumer electronics such as digital cameras and camcorders, automotive, military/aerospace, medical, computer, and telecommunications products. Each market segment has particular needs and drivers that require a diverse set of structures and configurations. SiP examples are provided, including details on the number and type of die, package type and body size, configuration, lead count, and substrate. Drivers for the use of SiP in each application area are described, along with performance requirements and functions.

The report answers the key question of how SiPs are different from multichip packages of the past. One application—wireless products—stands out as a high-volume driver that did not exist a dozen years ago when many multichip packages were first introduced. SiPs deliver increased functionality and performance in small form factor for mobile communication, resulting in significantly greater adoption rates than any previous multichip module. A variety of SiPs are found in the RF, digital baseband, and transceiver sections of mobile phone. Emerging applications for mobile phones include mini hard disks and camera modules. Both planar and stacked configurations are in use and several companies, including Philips, STMicroelectronics, and SyChip, have introduced integrated passive substrate solutions.

A five-year industry outlook and projections by market are provided for each application. With a unit growth rate of almost 20 percent CAGR between 2004 and 2009, semiconductor designers and fabs, along with substrate providers, assembly houses, circuit board manufacturers, EMS companies, and systems houses are experiencing the benefits of SiP and the changes brought about by its use. Each facet of the SiP supply chain, including design, procurement, manufacturing, assembly, and test, is analyzed. New concerns, including logistical and engineering issues, wafer thinning, and assembly, are addressed. The report explains how the issue of KGD has driven the development of new package configurations such as package-on-package and package-in-package. An insight into the relationship between SiP and system-on-chip (SoC) as both competing and complementary solutions is also included.

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