

Exhibit 14



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Overview

Drawing file download :

Flash memory is nonvolatile, solid state semiconductor storage media that retains stored data without the need for any external power supply. This document describes the High-density Packaging Technology for Flash memory products, which stacks individual memory chips on top of one another within a single package with a low-profile, enabling the production of flash memory devices with the highest densities and storage capacities.

Packaging Technology for Flash Memory

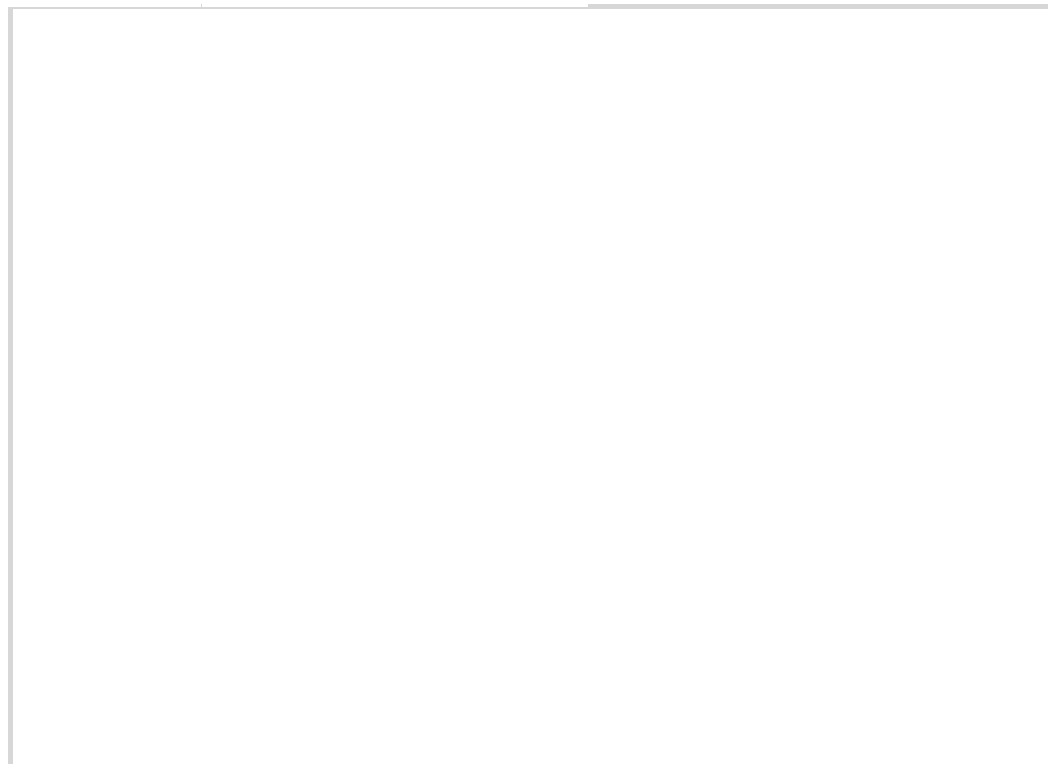
Flash memory packages are commercially available in several package types, such as TSOP (Thin Small Outline Package), and FBGA (Fine-pitch Ball Grid Array), among others. The end application's reading and writing speed, the available footprint, and required density are the primary dictators of the type of packages selected for deployment.

Internally, the die stack design for the flash memory stack is critical factors to determine the packaging yield, its reliability of products, and its form factor. Figure 1 below illustrates the internal layout of a flash memory die stack structures in a standard BGA package.

FBGA HDP

FBGA ODP

FBGA QDP



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FBGA HDP



* The above image is an artist rendering and may differ from the actual product.

As the illustration shows, this package "stacks" several memory dies to achieve the desired storage capacity for the complete chip. The immediate advantage of this approach is a significant saving in the total area occupied by the memory device. The die stack design is thus extensively used in flash memory for applications where space is severely restricted, such as mobile handsets, SSDs, and memory cards, among others.

Samsung's advanced processing and packaging techniques for the die stack design ensure that the flash memory devices are optimized for the highest levels of speed and data throughputs, the smallest footprint, and the lowest power consumption. Samsung is an industry-leader in the flash memory segment and has developed memory with up to 16 die stacks on a single package, using the optimized stacking technologies.

The leading-edge high-level die stacking technology is resulting in faster and higher capacity nonvolatile storage devices, such as solid state drives. Additionally, this technology promises to significantly increase the amount of data storage capacities in newer generation computing and communication devices, such as mobile handsets, and portable media players.

Key Features and Benefits of Samsung's Packaging Techniques for Flash Memory

as listed below:

Ultra-high memory densities:

Samsung is the world's largest memory supplier and Samsung flash memory is the highest density flash memory across the electronics and semiconductor segment. As an example, Samsung supplies 128 GB flash memory devices internally organized as 16-stack MCP flash memory, with 64 Gb per die.

Multi-channel I/O capability:

Samsung flash memory packages are designed with multi-channel I/O, making them capable of responding to more than 1 data transfer request at the same time. For example, a flash memory package with 2 I/O channels can simultaneously process a read request and a write request (or 2 write requests, or 2 read requests). Samsung flash memory packages support a maximum of 4 I/O channels at a world-first.

Lowest footprints and thinnest profiles:

Samsung's industry-leading processes provide the smallest packages for all types of flash memory, resulting in significant reductions in their physical sizes, and in the board space occupied by the device in the final application. The processes also ensure that the package profile, or height, is kept to its minimum possible value, making it easier to deploy the memory device in space-constrained applications such as SSD modules of notebooks, tablets, and mobile handsets.

Very high thermal stability and operational reliability:

Samsung's advanced processes for packaging all types of flash memory ensure that the device operates consistently and reliably under extreme temperature conditions.

Available in halogen-free composition:

Samsung's production processes are optimized to use environmentally-friendly constituents. Samsung flash memory products are also available in a halogen-free composition to comply with globally defined standards for halogen-free electronic devices and components.

Areas that can Benefit from Samsung's Packaging Techniques for Flash Memory

Flash memory is used in a host of consumer, industrial, and automotive electronics, and Samsung's advanced packaging techniques provide flash memory a multitude of benefits, such as smaller sizes, increasing densities, and lower power consumption levels..

Some of the principal areas that stand to benefit from using Samsung's packaging techniques for flash memory include:

Computing devices:

Desktop PCs, notebooks, and servers are gradually switching from HDDs to flash memory-based SSDs for data storage, due to the latter's reliability and lower power consumption. Advances in flash memory technologies have now made available SSDs that equal (or rival) the storage capacities of HDDs.

As buffer memories in hybrid drives:

A hybrid drive integrates some amount of flash memory onboard a conventional HDD, with the flash memory acting as a "buffer" to reduce data access times. Such drives are usually referred to as "hybrid SSDs" and offer better performance than conventional HDDs.

As removable storage media:

Flash memory is widely used as portable storage media, in devices such as USB drives. With higher levels of integration and increasing densities of flash memory, higher capacity, flash-based external HDDs are also available. Flash memory is also available for devices such as smartphones, tablet computers, and PMPs, as flash cards - a form of removable storage media.

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