



Toshiba Memory Europe Announces UFS 2.1-Compliant Embedded NAND Flash for Automotive Applications

Extended temperature memory products address data storage demands of increasingly complex applications including infotainment and ADAS

Düsseldorf, Germany, 12 December 2017 - Toshiba Memory Europe GmbH has begun sample shipments of embedded NAND flash memory products for automotive applications that are compliant with JEDEC UFS^[1] version 2.1^[2]. The new products meet AEC-Q100 Grade 2^[3] requirements, support the wide temperature range of -40°C to +105°C, and offer the enhanced reliability capabilities that are required by increasingly complex automotive applications.

The new embedded NAND flash memory products integrate NAND chips fabricated with 15nm process technology and a controller in a single package. Five different capacities of 16GB, 32GB, 64GB, 128GB and 256GB^[4] support a variety of automotive applications. These include infotainment, which typically needs high-capacity storage, and wireless communications, which may need only a small capacity.

Storage requirements for automotive applications continue to increase as systems including automotive information and entertainment systems and ADAS^[5] become more sophisticated. UFS supports their high performance and density needs. The addition of automotive UFS

expands Toshiba Memory Europe's line-up of embedded NAND flash memory products for automotive applications, which currently includes automotive e-MMC^[6] products. Utilising the UFS interface allows the new products to achieve sequential read of 850MB/s and random read of 50KIOPs, which are approximately 2.7 times and 7.1 times faster than their current e-MMC counterparts, respectively.^[7]

Other new functions specifically suited to automotive applications have been added to the new UFS products, including Refresh, Thermal Control and Extended Diagnosis. Refresh can be used to refresh data stored in the UFS and can contribute to the extension of the data's life span. Thermal Control protects against overheating in the high temperatures that can occur in automotive applications. Extended Diagnosis helps users to understand the condition of the product.

Toshiba Memory's UFS products have been used to boost overall system performance in mobile devices, and the introduction of automotive UFS products is expected to have a similarly positive impact on the development of automotive information and entertainment systems and ADAS. Toshiba Memory Corporation is already in discussion with major automobile makers on the possibility of implementing the new line-up in next-generation projects. As the storage requirements for automotive applications continue to grow, Toshiba Memory Corporation will continue to lead the market by reinforcing its line-up of high-performance, high-density memory solutions targeting the sector.

Outline of the New Products

Interface	JEDEC UFS V2.1 standard HS-G3 interface
Capacity	16GB, 32GB, 64GB, 128GB, 256GB
Power Supply Voltage	2.7-3.6V (Memory core) 1.7V-1.95V (Interface)
Temperature Range	-40°C to +105°C

Product Name	Capacity	Package		Sample Date
THGAF9G7L1LBAB7	16GB	153Ball FBGA	11.5x13.0x1.0mm	Dec. 2017
THGAF9G8L2LBAB7	32GB	153Ball FBGA	11.5x13.0x1.0mm	Dec. 2017
THGAF9G9L4LBAB8	64GB	153Ball FBGA	11.5x13.0x1.2mm	Dec. 2017
THGAF9T0L8LBAB8	128GB	153Ball FBGA	11.5x13.0x1.2mm	Dec. 2017
THGAF9T1LBLBABY	256GB	169Ball FBGA	12.0x16.0x1.6mm	2Q, 2018 (Apr. - Jun.)

*Company names, product names, and service names mentioned herein may be trademarks of their respective companies.

Notes

[1] Universal Flash Storage (UFS) is the product category for the class of embedded memory products built to the JEDEC UFS standard specification.

[2] One of the standard specifications of embedded NAND flash memory defined by JEDEC.

[3] Electrical component qualification requirements defined by the AEC (Automotive Electronics Council).

[4] Product density is identified based on the density of memory chip(s) within the product, not the amount of memory capacity available for data storage by the end user. Consumer-usable capacity will be less due to overhead data areas, formatting, bad blocks, and other constraints, and may also vary with the host device and application – 1GB is calculated as 1,073,741,828 bytes. For details, please refer to applicable product specifications.

[5] Advanced Driver Assistance System

[6] e-MMC is a product category for a class of embedded memory products built to the JEDEC e-MMC Standard specification.

[7] Comparison of Toshiba Memory Corporation's 64GB devices.

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About Toshiba Memory Europe

Toshiba Memory Europe GmbH (TME) is the European business of the Toshiba Memory Corporation (TMC). Our company offers a broad product line of high-end flash memory products, including SD Cards, USB sticks, micro SDs and embedded memory components, in addition to solid state drives (SSD). TME maintains offices in Germany, France and the United Kingdom. The company's president is Masaru Takeuchi.

For more information on the full range of TME's memory and SSD products please visit <http://toshiba.semicon-storage.com>

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December 2017

Ref: TME002/A_EMEA