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Press Release


# Toshiba Unveils Single Package SSDs with 64-Layer 3D Flash Memory

*New BG3 NVMe[1] SSDs offer ultra-compact design enabling mobile computing and IoT devices to be smaller, lighter, faster, and more power efficient*

**Düsseldorf, Germany, 03 August 2017 -** Toshiba Electronics Europe GmbH today announced the availability of the state-of-the-art BG3 series, its next generation single-package ball grid array (BGA) solid state drive (SSD) product line based on Toshiba's latest 64 layer, 3-bit-per-cell TLC (triple-level cell) BiCS FLASH. Designed to fuel the future of mobile devices, Toshiba's BG3 SSDs deliver better performance[2] and a smaller footprint than traditional SATA-based drives. Moreover, with its cost-effective DRAM-less design, the unique BG3 series enables a high quality user experience at a fraction of the power requirement of other NVM Express[3] (NVMe) SSDs[4].

Toshiba's BG3 series leverages the Host Memory Buffer (HMB) feature in NVMe Revision 1.2.1 to maintain high performance without integrated DRAM by using host memory for flash management purposes. This powerful combination allows devices to harness the performance of NVMe storage while maximizing footprint and affordability to deliver a next-generation mobile experience to end users. Both fast and economical, these miniaturized SSDs also offer data center and enterprise applications an alternative solution for server boot storage.

With style and portability top of mind for today's laptop and tablet manufacturers, the BG3 series was designed specifically to enable even slimmer and more power efficient devices. By eliminating DRAM from its design, Toshiba's BG3 series offers the world's thinnest SSDs[5] available at just 1.3mm high and delivers lower power consumption to maximize battery life.

Toshiba BG3 SSDs are small in size but not performance. Featuring a PCI Express (PCIe)[6] Gen3 x2 lane and NVMe Revision 1.2.1 architecture, BG3 delivers to up to 1520 MB/s sequential read, 2.7 times the theoretical maximum bandwidth of SATA 6Gbit/s and up to 840 MB/s sequential write[7], 1.5 times the theoretical maximum bandwidth of SATA 6Gbit/s. Additionally, BG3 also features SLC cache for excellent performance to accelerate burst type workloads, such as those routinely experienced on Windows[8] -based PCs.

The ultra-compact BG3 series is available in 128GB, 256GB, and 512GB capacities[9]. All three models are available in a surface-mount BGA (M.2 1620) or a removable module (M.2 2230) form factor for platform design flexibility.

"Toshiba's third generation BG SSDs are ideal for mobile and IoT computing and datacenter use alike", says Paul Rowan, General Manager at Toshiba Electronics Europe, SSD Business Unit. "Especially in datacenters the deployment of BG3 can greatly reduce both capital and operation expenses as the new BG3 series bridges the power and price gap between enterprise SATA and mainstream client NVMe SSDs while still providing boot storage with improved power consumption and compact footprint", he concludes.

BG3's single-package design features a Toshiba-developed controller and firmware, tightly integrated with Toshiba Flash memory and is optimized for performance, low power, and reliability. To address modern security needs, self-encrypting drive options (SED) with TCG[10] Opal Version 2.01 are available.

The BG3 series is sampling to customers and will be demonstrated at the Flash Memory Summit 2017 in Santa Clara, CA, USA, from August 8 to 10 in booth #407.

For more information on Toshiba's line of industry-leading SSDs, please visit: https://toshiba.semicon-storage.com/eu/product/storage-products.html .

Notes:

[1] NVMe is a trademark of NVM Express, Inc.

[2] Faster sequential read/write transfer speeds

[3] NVM Express and the NVM Express logo are registered trademarks.

[4] Compared to M.2 2280 SSDs and M.2 1620/2230 SSDs containing DRAM

[5] 128GB and 256GB BGA models; Toshiba Memory Corporation survey, as of August 3, 2017

[6] PCI EXPRESS and PCIe are registered trademarks of PCI-SIG.

[7] Toshiba Memory Corporation survey based on sequential read and write speeds of 128KiB units, using 512GB models in the BG3 series under Toshiba Memory Corporation test conditions. Read and write speed may vary, depending on the host device, read and write conditions, and file size. Toshiba Memory Corporation defines a megabyte (MB) as 1,000,000 bytes and a kibibyte (KiB) as $2^{10}$ bytes, or 1,024 bytes. The sequential read and write performance mentioned herein are reference data, and may vary with the BG3 product data in the datasheet.

[8] Windows is a registered trademark of Microsoft Corporation in the United States and/or other countries.

[9] Definition of capacity: Toshiba Memory Corporation defines a gigabyte (GB) as 1,000,000,000 bytes. A computer operating system, however, reports storage capacity using powers of 2 for the definition of 1GB = $2^{30}$ bytes = 1,073,741,824 bytes, and therefore shows less storage capacity. Available storage capacity (including examples of various media files) will vary based on file size, formatting, settings, software and operating system, such as Microsoft Operating System and/or pre-installed software applications, or media content. Actual formatted capacity may vary.

[10] Trusted Computing Group

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

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**About Toshiba Electronics Europe**
Toshiba Electronics Europe (TEE) is the European electronic components business of Toshiba Electronic Devices and Storage Corporation. TEE offers a broad IC and discrete product line including high-end memory, microcontrollers, ASICs and ASSPs for automotive, multimedia, industrial, telecoms and networking applications. The company also has a wide range of power semiconductor solutions as well as storage products including HDDs, SSDs, SD Cards and USB sticks.

TEE was formed in 1973 in Neuss, Germany, providing design, manufacturing, marketing and sales and now has headquarters in Düsseldorf, Germany, with branch offices in France, Italy, Spain, Sweden and the United Kingdom. TEE employs approximately 300 people in Europe. Company president is Mr. Akira Morinaga.
For more company information visit TEE's web site at www.toshiba.semicon-storage.com.

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