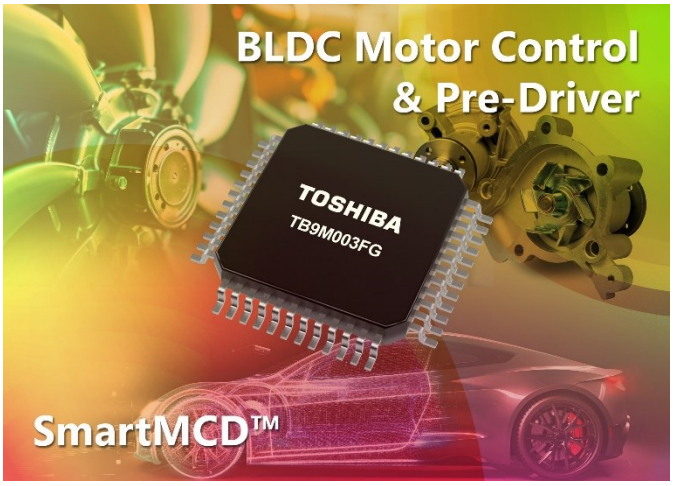

Toshiba releases motor control driver IC enhanced with built-in microcontroller and gate driver for efficient and precise motor control

Highly integrated device enables space and system cost savings in automotive pump, fan, and body control applications

Düsseldorf, Germany, 02nd April 2024 – Toshiba Electronics Europe GmbH ("Toshiba") has launched a motor control driver IC that implements a gate driver and a CPU core together with a comprehensive set of features and capabilities for driving three-phase brushless DC (BLDC) motors and permanent magnet synchronous motors (PMSM) more efficiently. With a focus on performance, flexibility and ease of integration, the TB9M003FG is the first device in Toshiba's Smart Motor Control Driver (SmartMCD™) family. Typical applications include electric pumps, fans, body control, and thermal management systems in automotive.

The SmartMCD TB9M003FG uses Toshiba's advanced mixed-signal process technology, combining an Arm® Cortex®-M0 CPU with a vector engine co-processor and pre-drivers to control external B6 N-channel MOSFETs. This level of integration of the device, which is housed in an HTQFP48 thermal enhanced package measuring 9.0mm × 9.0mm, allows for smaller, simpler and lower-cost 30 – 1000W BLDC motor systems. The device simply connects directly to the battery and local interconnect network (LIN) bus, which features a built-in wake-up for power-efficient operation and communication.

The implemented vector engine co-processor enables precise field-oriented control, which is essential for efficient motor control, particularly in applications requiring accurate positioning, torque or speed control. It accelerates the necessary mathematical operations and reduces the load on the CPU. The high-speed PWM frequency and advanced control algorithms contribute to smooth and quiet operation, reducing vibration and noise. Features such as 1-shunt sensorless measurement, reduced component count, and smaller program code size contribute to lower overall system costs.

The operating temperature range (T_a) of the AEC-Q100 (Grade 0) qualified device is -40°C to +150°C, ensuring reliability in harsh automotive environments. The SmartMCD incorporates current limiter, overcurrent, V_{BAT} overvoltage, and overtemperature protection circuitry, and fault detection for undervoltage, external power MOSFET open/short failure and overheating. This eliminates the need for several external circuits, further reducing system cost and saving space and design effort.

The SmartMCD Motor Studio PC tool allows for easy parameter configuration, drive control, real-time logging and diagnostics via a high-speed UART. Together with the SmartMCD TB9M003FG board from MIKROE, it allows quick and easy system evaluation and BLDC motor application development and prototyping. The flexible licensing options for the device's development tools and software libraries, make it easier for developers to access and apply the full capabilities of the motor control system.

Mass production of the SmartMCD TB9M003FG starts today. Additional information can be found on the Toshiba website: https://toshiba.semicon-storage.com/eu/semiconductor/product/automotive-devices/automotive-brushless-motor-driver-ics.html

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Notes:
SmartMCD™ is a registered trade mark of Toshiba Electronic Devices & Storage Corporation

About Toshiba Electronics Europe
Toshiba Electronics Europe GmbH (TEE) offers European consumers and businesses a wide variety of hard disk drive (HDD) products plus semiconductor solutions for automotive, industrial, IoT, motion control, telecoms, networking, consumer and white goods applications. Next to HDDs, the company's broad portfolio encompasses power semiconductors and other discrete devices ranging from diodes to logic ICs, optical semiconductors as well as microcontrollers and application specific standard products (ASSPs) amongst others.

In addition, TEE also offers Toshiba's SCiB™ battery cells and modules with lithium titanium oxide (LTO) for heavy-duty applications and Silicon Nitride (SiN) ceramic substrates used in power semiconductor modules, inverters and converters for their heat dissipation characteristics and strength.

TEE has its headquarters in Düsseldorf, Germany, with branch offices in France, Italy, Spain, Sweden and the United Kingdom providing marketing, sales and logistics services.

Visit Toshiba's websites at www.toshiba.semicon-storage.com, www.scib.jp/en and www.toshiba-tmat.co.jp/en/ for further company and product information.

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