Toshiba releases automotive gate driver IC for brushed DC motors

New reference design features gate driver optimised for simplified latch and lock applications that do not require speed control

Düsseldorf, Germany, 13th March 2025 – Toshiba Electronics Europe GmbH ("Toshiba") has commenced the mass production of the AEC-Q100 qualified TB9103FTG MOSFET gate driver IC, featured in Toshiba's recent motor control reference design for driving automotive brushed DC motors. This control board demonstrates how the TB9103FTG can enable more compact system designs in latch and lock motor applications that do not require speed control.

TB9103FTG provides the flexibility to function as either a single-channel H-bridge or two half-bridge channels gate driver. When paired with an external MOSFET, it can be used to replace mechanical relays, thereby improving equipment reliability by reducing mechanical wear and tear. Its low standby current further contributes to minimising power consumption in the sleep mode. The device has a built-in charge pump circuit for controlling the gate voltage of the external MOSFETs driving the motors. Additionally, a gate monitoring feature safeguards against through-current by dynamically adjusting the gate signal's output timing for both high-side and low-side MOSFETs.

The TB9103FTG gate driver operates in temperatures ranging from -40 to +125°C and is housed in a space-saving VQFN24 package measuring 4.0×4.0mm.

Using Toshiba's RD245 reference design, a brushed DC motor can be controlled either by manually adjusting the switches on the board or else by using an external microcontroller (MCU). This compact reference design board also supports testing of Toshiba's 10A XPN7R104NC and 20A XPH3R304PS power MOSFETs for motor driving. It features a reverse polarity protection circuit implemented using the XPH1R104PS power MOSFET, while the TB9005FNG 5V voltage regulator IC enables this design to operate from a wide 8V to 18V input voltage range.

Read more about TB9103FTG gate driver on Toshiba's website: https://toshiba.semicon-storage.com/eu/semiconductor/product/automotive-devices/detail.TB9103FTG.html

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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.

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Contact details for publication:
Toshiba Electronics Europe GmbH, Hansaallee 181, D-40549 Düsseldorf, Germany
Tel: +49 (0) 211 5296 0
Web: www.toshiba.semicon-storage.com/eu/company/news.html

Contact details for editorial enquiries:
Michelle Shrimpton, Toshiba Electronics Europe GmbH
Tel: +44 (0)7464 493526
E-mail: MShrimpton@teu.toshiba.de

Issued by:
Birgit Schöniger, Publitek
Tel: +49 (0) 4181 968098-13
Web: www.publitek.com
E-mail: birgit.schoeniger@publitek.com

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