



Ultra-compact DFN8x8 packaged 650V SiC MOSFETs from Toshiba enhance power density and efficiency in industrial equipment

Low figure of merit ($R_{DS(ON)} \times Q_{gd}$) contributes to higher efficiency, pushing the performance envelope of high-voltage power system designs

Düsseldorf, Germany, 20th May 2025 – Toshiba Electronics Europe GmbH (“Toshiba”) announces volume shipments of its 3rd generation, 650V silicon carbide (SiC) MOSFETs in the compact DFN8x8 package for industrial equipment, the [TW031V65C](#), [TW054V65C](#), [TW092V65C](#), and [TW123V65C](#). An important characteristic of Toshiba’s next-generation process is the consistently low drain-source on-resistance ($R_{DS(ON)}$) temperature coefficient of the devices. The low $R_{DS(ON)} \times$ gate-drain charge (Q_{gd}) figure of merit (FoM), therefore, enables engineers to enhance the power density and efficiency of numerous high-voltage applications, including switched-mode power supplies (SMPSs), electric vehicle (EV) charging stations, uninterruptible power supplies (UPS), and photovoltaic (PV) inverters.

The surface-mount DFN8x8 package reduces volume by more than 90% compared to existing lead-inserted packages, such as TO-247 and TO-247-4L(X), improving the power density of equipment while enabling automated assembly. Surface mounting also reduces parasitic impedance, thereby cutting switching losses and contributing to the low FoM, which improves efficiency. With less heat needing to be dissipated, high-voltage power system designs can be simpler and more compact, making them suitable for space-constrained applications or furthering miniaturisation.

Furthermore, the multi-pin device allows a Kelvin connection of its signal-source pin for the gate drive. This capability reduces the inductance influence in the source wire within the package, enabling high-speed switching performance. As a result, under specific test conditions ($V_{DD}=400V$, $V_{GG}=+18/0V$, $I_D=20A$, $R_G=4.7\Omega$, $L=100\mu H$), one of the new products, the TW054V65C, reduces turn-on loss by approximately 55% and turn-off loss

by approximately 25% compared to existing Toshiba products, thereby helping to reduce power loss in equipment.

Toshiba will continue to expand its lineup to meet market trends and contribute to improving equipment efficiency and increasing power capacity.

To learn more about Toshiba's 650V SiC MOSFETs, follow the links

<https://toshiba.semicon-storage.com/eu/semiconductor/product/mosfets/detail.TW031V65C.html>

<https://toshiba.semicon-storage.com/eu/semiconductor/product/mosfets/detail.TW054V65C.html>

<https://toshiba.semicon-storage.com/eu/semiconductor/product/mosfets/detail.TW092V65C.html>

<https://toshiba.semicon-storage.com/eu/semiconductor/product/mosfets/detail.TW123V65C.html>

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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 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.

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 Schöninger, Publitek

Tel: +49 (0)172 617 8431

Web: www.publitek.com

E-mail: birgit.schoeniger@publitek.com

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