



New high-performance 150V U-MOS X-H MOSFET from Toshiba

Improved reverse recovery significantly reduces synchronous rectification losses

Düsseldorf, Germany, 30th March 2023 – Toshiba Electronics Europe GmbH (“Toshiba”) has launched a new 150V N-channel power MOSFET based upon their latest generation U-MOS X-H Trench process. The new device (TPH9R00CQ5) is specifically designed for use in high performance switching power supplies such as those used in communication base stations as well as other industrial applications.

With a maximum V_{DS} rating of 150V and current handling (I_D) of 64A, the new device boasts a very low drain-source On-resistance ($R_{DS(ON)}$) of just 9.0m Ω (max). This is a reduction of more than 40% versus previous generation product TPH1500CNH1.

In high performance power solutions that use synchronous rectification, reverse recovery performance is highly important. Due to inclusion of a high speed body diode, the new TPH9R00CQ5 reduces the reverse recovery charge (Q_{rr}) by around 74% (to 34nC typ.) when compared to an existing device such as the TPH9R00CQH. Additionally, the reverse recovery time (t_{rr}) of just 40ns is an improvement of over 40% compared with earlier devices.

Along with a low gate charge (Q_g) of just 44nC, these improvements contribute significantly to reduced losses and increased power density in high performance, efficient power solutions. A channel temperature of 175°C (max) is extraordinary for MOSFETs with high speed diode and will offer the designer increased thermal headroom.

The new device also reduces spike voltages created during switching, thereby improving EMI characteristics of designs, and reducing the need for filtering. It is housed in a versatile, surface-mount SOP Advance(N) package measuring just 4.9mm x 6.1mm x 1.0mm.

To support designers, Toshiba has developed a G0 SPICE model for rapid verification of the circuit function as well as highly accurate G2 SPICE models, for accurate reproduction of transient characteristics.

Further design support is available in the form of advanced reference designs, now available from Toshiba's website. These include a 1kW non-isolated buck-boost DC-DC converter, a 3-phase multi-level MOSFET-based inverter and a 1kW full bridge DC-DC converter – all of which use the new TPH9R00CQ5.

Shipments of the new device start today, and Toshiba will continue to expand their lineup of power MOSFETs that reduce power losses and increase the efficiency of switching power supplies, helping improve the efficiency of equipment.

You can find more information on the new TPH9R00CQ5 MOSFET here: <https://toshiba.semicon-storage.com/eu/semiconductor/product/mosfets/12v-300v-mosfets/detail.TPH9R00CQ5.html>

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About Toshiba Electronics Europe

[Toshiba Electronics Europe GmbH](#) (TEE) is the European electronic components business of [Toshiba Electronic Devices and Storage Corporation](#). TEE offers European consumers and businesses a wide variety of innovative 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.

TEE has headquarters in Düsseldorf, Germany, with branch offices in France, Italy, Spain, Sweden and the United Kingdom providing marketing, sales and logistics services. The company president is Mr. Tomoaki Kumagai.

For more company information visit TEE's website at www.toshiba.semicon-storage.com.

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