



New N-channel power MOSFETs leverage advanced heat dissipation capabilities to support larger automotive currents

40V devices offer elevated current capabilities and lower on-resistance figures in thermally-enhanced L-TOGL™ packages

Düsseldorf, Germany, 31st January 2023 – Toshiba Electronics Europe GmbH (“Toshiba”) has launched two new automotive-grade 40V N-channel power MOSFETs that will have real impact on next-generation vehicle designs. The XPQR3004PB and XPQ1R004PB utilise the game-changing large transistor outline gull-wing leads package format - referred to as L-TOGL™.

Even before going into volume production, the XPQR3004PB has succeeded in winning the Power Semiconductor/Driver of 2022 category at the recent World Electronics Achievement Awards (WEAA) organised by AspenCore.

Thanks to their L-TOGL packages, and the enhanced heat dissipation characteristics derived, the newly released Toshiba MOSFETs are highly optimized for handling large currents. They each feature high drain current ratings (400A for the XPQR3004PB and 200A for the XPQ1R004PB), plus industry-leading on-resistance values (0.3mΩ for the XPQR3004PB and 1mΩ for the XPQ1R004PB).

There is no internal post structure (solder connection) on these devices. This is achieved by connecting the source and outer leads with an innovative copper clip. The use of a multi-pin structure for the source leads reduces the package resistance (and associated losses) by about 70% when compared with the existing TO-220SM(W) package. The resulting drain current (I_D) rating of the XPQR3004PB, represents a 60% increase over the existing TKR74F04PB, housed in the TO-220SM(W) package. Furthermore, the thick

copper frame reduces junction-to-case thermal impedance substantially. It is 0.2°C/W for the XPQR3004PB and 0.65°C/W for the XPQ1R004PB. This eases heat dissipation, lowers operating temperatures and enhances reliability.

Intended for use in demanding automotive applications at temperatures up to 175°C, the XPQR3004PB and XPQ1R004PB are both AEC-Q101 qualified. Their gull-wing leads reduce mounting stress and allow easy visual inspection - thereby helping to improve the solder joint reliability.

When used in high-current automotive applications, such as semiconductor relays or integrated starter generators (ISGs), the XPQR3004PB and XPQ1R004PB enable designs to be simplified and the number of MOSFETs required to be fewer. This means that size, weight and cost reductions can all be realised.

Volume shipments of these devices have now begun.

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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.

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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