



Toshiba launches first 30V N-Channel Common-Drain MOSFET

New device offers bi-directional power within USB applications

Düsseldorf, Germany, 16th November 2023 – Toshiba Electronics Europe GmbH (“Toshiba”) has launched their first 30V N-channel common-drain MOSFET. The new SSM10N961L device offers low-loss operation and is specifically intended for use within devices with USB interfaces. Additionally, it may be used for protecting battery packs within mobile applications.

With the ubiquity of USB interfaces, many components and devices have been developed to support USB standards. The USB Power Delivery (USB PD) standard supports higher power levels from 15W (5V / 3A) to a maximum of 240W (48V / 5A) and allows swapping of the power supply and receiving side. This requires devices with USB charging to support bi-directional power and this is the use case that the new SSM10N961L N-channel common drain MOSFET has been designed for.

Until now, Toshiba’s N-channel common-drain MOSFETs have been 12V products primarily intended for the protection of lithium-ion (Li-ion) battery packs within smartphones. The newly released 30V product can be used for applications requiring voltages higher than 12V such as load switching for power lines of USB charging devices and the protection of Li-ion battery packs for battery powered appliances.

The SSM10N961L combines two N-channels in a common drain configuration which is the feature that allows for bi-directional operation. The source-source breakdown voltage ($V_{(BR)SSS}$) is 30V for use in higher voltage applications such as those found in laptops and tablets. To reduce losses in all applications, the source-source on-resistance ($R_{SS(ON)}$) is typically 9.9m Ω .

When mounted on a 18 μ m, 407mm² Cu pad, the current rating of the device is 9.0A. If the pad size and thickness are increased to 70 μ m and 687.5mm², the current rating increases to 14.0A.

Despite the power handling capability of the SSM10N961L, the device is housed in a small thin package (TCSPAG-341501) measuring just 3.37mm×1.47mm x 0.11mm thereby allowing for high-density solutions to be developed.

By combining the new device with a TCK42xG driver IC it is possible to form a load switching circuit with a backflow prevention function or a power multiplexer circuit that can switch operations between Make-Before-Break (MBB) and Break-Before-Make (BBM).

Toshiba have released a [Power Multiplexer Circuit](#) as a reference design based upon this combination of products. The operation of the circuit has been verified by Toshiba, giving designers confidence that it will simplify the design process and shorten timescales.

Shipments of the new device start today.

Visit the Toshiba website for further details: <https://toshiba.semicon-storage.com/eu/semiconductor/product/mosfets/detail.SSM10N961L.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 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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