

## **MOSFETs For Hot-Swap Increase SOA And Slash PCB Footprint**

[Nexperia's](#) 80-V PSMN4R2-80YSE and 100-V PSMN4R8-100YSE are application-specific MOSFETs (ASFETs) with enhanced safe operating area (SOA) performance. They target hot-swap and soft-start applications in 5G telecom systems, and 48-V server environments and industrial equipment needing e-fuse and battery protection (Figs. 1 and 2).

Previously, MOSFETs have suffered from the Spirito effect, whereby the SOA performance drops off rapidly due to thermal instability at higher voltages. Nexperia's rugged, enhanced SOA technology eliminates the "Spirito-knee," increasing SOA by 166% at 50 V when compared to previous generations in D2PAK, according to Nexperia.

Another important advancement is the inclusion of 125°C SOA characteristics on the datasheet. Mike Becker, senior international product marketing manager at Nexperia comments, "SOA is traditionally only specified at 25°C, meaning designers have to derate for operation in hot environments. Our new hot-swap ASFETs include a 125°C SOA specification, eliminating this time-consuming task and confirming Nexperia's excellent performance even at elevated temperatures".

The PSMN4R2-80YSE (80 V, 4.2 mΩ) and PSMN4R8-100YSE (100 V, 4.8 mΩ) hot-swap ASFETs are packaged in the Power-SO8 compatible LFAK56E. The unique internal copper-clip construction of the package improves thermal and electrical performance while substantially reducing footprint size. These LFAK56E products measure just 5 mm x 6 mm x 1.1 mm, offering reductions of 80% and 75% for PCB footprint and device height respectively, compared to the D2PAK of previous generations. The devices also feature a maximum junction temperature of 175°C, meeting IPC9592 regulations for telecom and industrial applications.

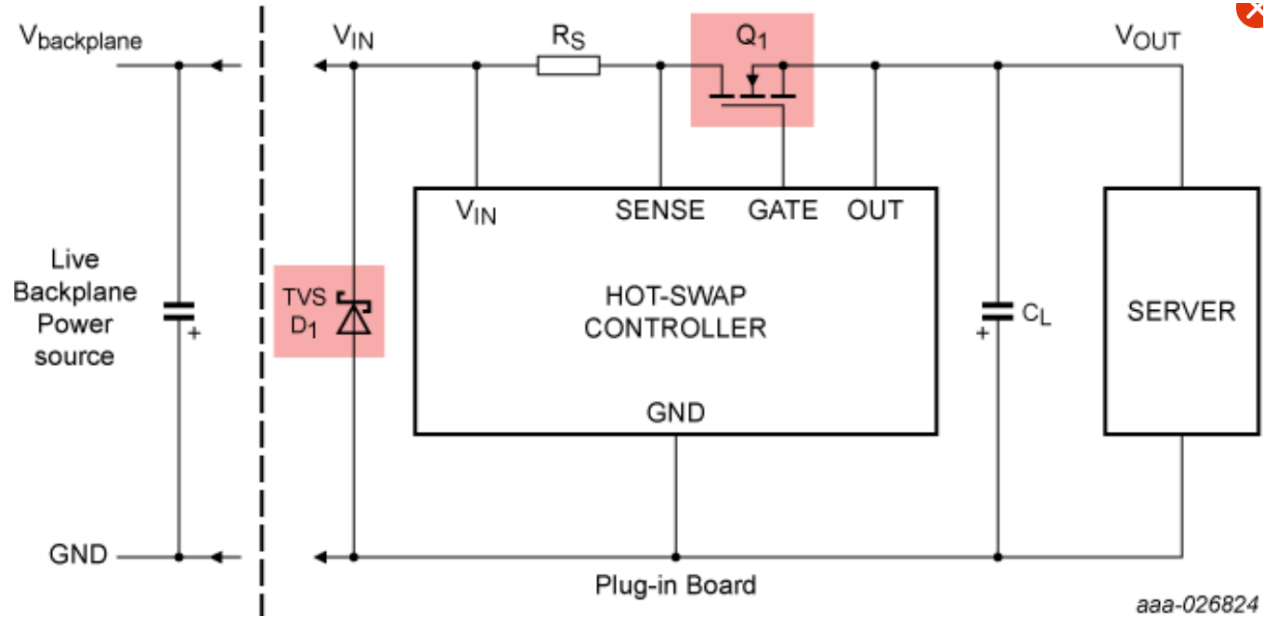
Adds Becker, "A further benefit is improved current sharing in high power applications that demand multiple hot-swap MOSFETs to be used in parallel, improving reliability and reducing system cost. Nexperia is widely recognized as the market leader for hot-swap MOSFETs. With these latest ASFETs, we have again raised the bar."

ASFETs are a new breed of MOSFET optimized for use in particular design scenarios. By focusing on specific parameters critical to an application, sometimes at the expense of others that are less important in the same design, new levels of performance can be achieved. The new hot-swap ASFETs use a combination of Nexperia's latest silicon technology and copper-clip package construction to significantly strengthen the SOA and minimize PCB area.

These hot-swap ASFETs are the latest devices to be fabricated on Nexperia's new 8-in. wafer production plant in Manchester, UK, with capacity ready for volume orders. For more information, including product specs and datasheets, see the ASFETs for Hotswap and Soft Start [page](#).



*Fig. 1. The 80-V and 100-V application-specific MOSFETs (ASFETs) minimize derating and improve current sharing for optimum performance, high reliability and reduced system cost. They target hot-swap and soft-start applications in 5G telecom systems, and 48-V server environments and industrial equipment needing e-fuse and battery protection.*



*Fig. 2. ASFETs for hotswap and soft start are designed specifically to support always-on applications and equipment. MOSFETs with a strong linear-mode performance and enhanced safe operating area are required to manage inrush current effectively and reliably when capacitive loads are introduced to the backplane. Once a replacement board is safely powered up, the MOSFET is turned fully on. In this mode of operation, a low on-resistance value is of primary importance, helping to keep temperatures down and system efficiency at a maximum.*