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40-V GaN Bidirectional Switches Save Space In Portable Designs

Infineon Technologies' IGK048B041S and IGK120B041S are additions to the company's CoolGaN BDS 40-V G3 bidirectional switch (BDS) family. These devices are said to reduce PCB footprint by up to 82% and cut component count in half. For engineers designing within the strict spatial constraints of modern smartphones, notebooks, and wearables, this is a significant and quantifiable step forward, says the vendor. Targeting compact consumer devices, the devices give power system designers greater flexibility to optimize efficiency and streamline designs without sacrificing performance.

"As consumer devices continue to shrink while power demands grow, engineers face increasing pressure to deliver more from less. The new CoolGaN BDS devices directly address this challenge," said Johannes Schoiswohl, GaN business line head at Infineon. "Each device integrates the function of two back-to-back silicon MOSFETs into a single component, reducing component count by half and simplifying PCB layouts. Design teams can leverage existing driver layout, avoiding costly redesigns and accelerating time to market. The result is a leaner and more cost-effective power path."

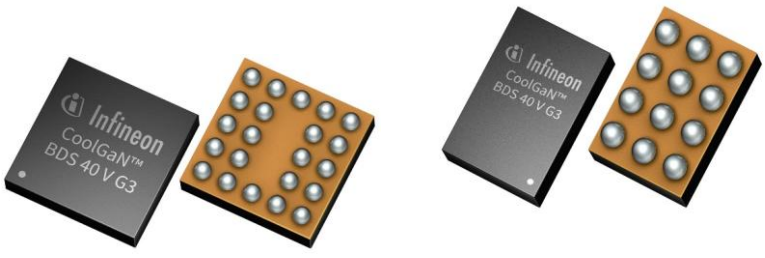
The BDS, like other GaN devices, is compatible with 5-V gate drive. Offered in WLCSP chip-scale packages measuring 2.1 mm x 2.1 mm and 1.7 mm x 1.2 mm, respectively, the IGK048B041S and IGK120B041S offer $R_{DD(ON)}$ values of 4.2-mΩ and 9-mΩ $R_{DD(ON)}$, respectively (see the figure).

The CoolGaN BDS devices further distinguish themselves through superior switching and leakage performance, says the vendor. Gate charge is said to be up to approximately 40% lower than comparable competing devices. Lower gate charge translates directly to faster switching transitions, reduced switching losses, and improved system efficiency in fast-charging applications.

Additionally, drain-to-drain leakage current is more than 85% lower than competing solutions, according to Infineon, underscoring the leakage advantages of GaN technology. Together, these characteristics reduce thermal rise, supporting long-term reliability and helping manufacturers meet increasingly stringent safety requirements.

Unlike silicon MOSFETs, which rely on a body diode that can allow unintended current flow, the CoolGaN BDS devices allow bidirectional voltage and current blocking. This bidirectional blocking capability is essential for applications such as USB overvoltage protection in smartphones and portable devices, where preventing unwanted reverse current is critical to protecting sensitive downstream components. The devices are said to be equally well suited to load switching and power multiplexing functions in multi-rail power architectures, where precise control of current direction across multiple supply rails is required.

The IGK048B041S and IGK120B041S are available now through Infineon's authorized distribution channels. For detailed product information, datasheets, and ordering options, see the Medium-voltage GaN bidirectional switches page.



(a) *(b)*

Figure. The 4-mΩ IGK048B041S (shown in (a)) and 9-mΩ IGK120B041S (shown in (b)) are 40-V CoolGaN bidirectional switches in WLCSPs that save space and reduce component counts in replacing silicon MOSFETs. Intended for use in smartphones, notebooks, and wearables, these devices can provide USB overvoltage protection or be used for load switching and power multiplexing.