150-V GaN HEMTs Raise Gate Withstand Voltage To 8 V

ROHM Semiconductor has developed 150-V GaN HEMT devices that offer what's described as the industry's highest (8 V) gate breakdown voltage (rated gate-source voltage) for optimized for power supply circuits in industrial and communication equipment. Increasing the rated gate-source voltage from the standard 6 V allows ROHM to propose a wider range of power solutions for a variety of applications, according to the company (see the figure).

ROHM will accelerate the development of GaN devices based on this technology, with sample shipment planned for September 2021. The first devices include a 40-mΩ, 2.0 nC device with an I_{DS} of 5 A, a 15-mΩ, 5.4-nC device with an I_{DS} of 15 A, and a 7-mΩ, 11.5-nC device with an I_{DS} of 20 A. Mass production of the company's first generation 150-V GaN devices will begin in 2022.

Application for the 150-V GaN devices include 48-V input buck converters for data centers and base stations, boost converter circuits for the power amplifier block of base stations, class D audio amplifiers and LiDAR drive circuits and wireless charging circuits for portable devices.

As GaN devices provide improved switching characteristics and lower on-resistance than silicon devices, they are expected to contribute to lower power consumption and greater miniaturization of switching power supplies used in base stations and data centers. However, drawbacks that include low rated gate-source voltage and overshoot voltage exceeding the maximum rating during switching pose major challenges to device reliability, according to Rohm.

In response, ROHM has succeeded in raising the rated gate-source voltage from the typical 6 V to 8 V using an original structure. This makes it possible to both improve the design margin and increase the reliability of power supply circuits using GaN devices that require high efficiency.

In addition to maximizing device performance with low parasitic inductance, ROHM is also developing a dedicated DFN package that facilitates mounting and delivers excellent heat dissipation, enabling easy replacement of existing silicon devices while simplifying handling during the mounting process. The DFN is offered as an alternative to the BGA currently available in the industry for GaN HEMTs in this voltage class.

For more information, view the presentation or contact the company.

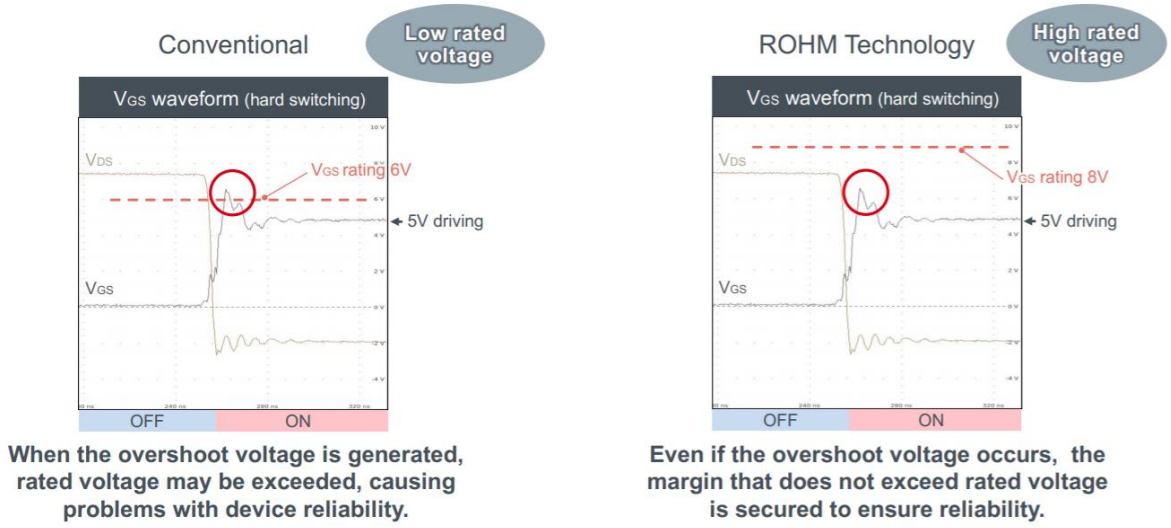

Figure. Rohm has developed 8-V gate-source voltage technology that contributed to improved design margin and higher reliability.

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