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200-V GaN FET Driver Is Space Grade

Texas Instruments' (TI's) new gate driver family, which includes the TPS7H6003-SP, TPS7H6013-SP, TPS7H6023-SP and TPS7H6005-SEP and others, offers ratings from 22 V to 200 V and supports different radiation levels. TI's space-grade GaN FET gate drivers cover the entire voltage range needed to design satellite power systems, including input power supply from solar panels, power distribution and conversion (see the figure).

According to the company, this family of half-bridge gate drivers includes the industry's first space-grade GaN FET driver that supports up to 200-V operation. The devices are available in pin-to-pin compatible ceramic and plastic packaging options and support three voltage levels. TI's advancements in space-grade power products enable engineers to design satellite power systems for all types of space missions using just one chip supplier.

Designers can use the family for applications spanning the entire electrical power system. The 200-V GaN FET gate driver is suitable for propulsion systems and input power conversion in solar panels. The 60-V and 22-V versions are intended for power distribution and conversion across the satellite. TI's family of space-grade GaN FET gate drivers offers different space-qualified packaging options for the three voltage levels. These include radiation-hardened; Qualified Manufacturers List (QML) Class P and QML Class V in plastic and ceramic packages, respectively, as well as radiation-tolerant space enhanced plastic (SEP) products.

Satellite systems are growing increasingly complex to meet the demand for more on-orbit processing and data transmission, higher-resolution imaging, and more precise sensing. To improve mission capabilities, engineers strive to maximize electrical power system efficiency. TI's gate drivers are designed to accurately drive GaN FETs with fast rise and fall times, improving power-supply size and density. This allows a satellite to more effectively use the power generated by its solar cells to perform mission functions.

"Our new portfolio enables satellites in low, medium and geosynchronous earth orbits to operate in the harsh environment of space for an extended period of time, all while maintaining high levels of power efficiency," said Javier Valle, product line manager, Space Power Products at TI.

Production quantities of the TPS7H6003-SP, TPS7H6013-SP, TPS7H6023-SP and TPS7H6005-SEP are available now on TI.com. Preproduction quantities of the TPS7H6015-SEP and TPS7H6025-SEP are also available, with the TPS7H6005-SP, TPS7H6015-SP and TPS7H6025-SP available for purchase by June 2025. Additionally, development resources include evaluation modules for all nine devices, as well as reference designs and simulation models.

For more information, see the 200-V TPS7H6005-SEP, 60-V TPS7H6015-SEP, and 22-V TPS7H6025-SEP pages. Also see the technical article, "How you can optimize SWaP for next-generation satellites with electronic power systems."

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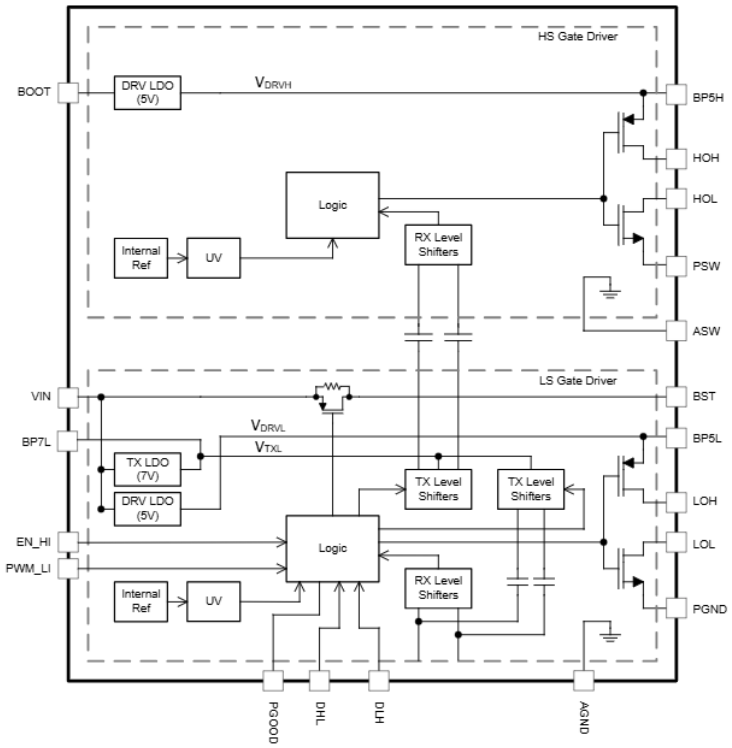
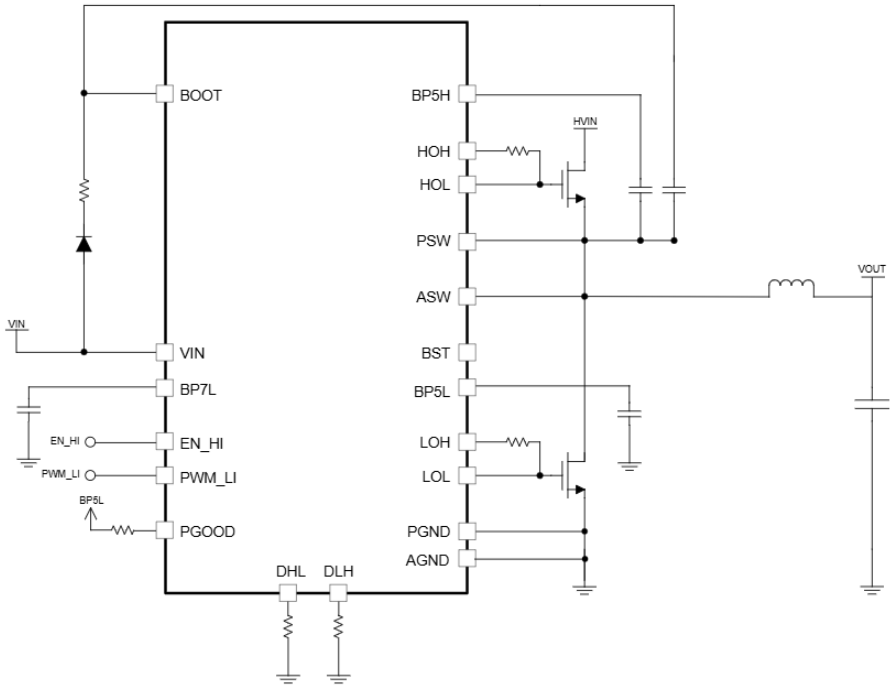


(a)



(b)

Figure. TI's half-bridge gate drivers are designed to accurately drive GaN FETs with fast rise and fall times, improving power-supply size and density. Offered in rad-hard and rad-tolerant versions, with 22-V, 60-V and 200-V ratings, this gate driver family covers the entire voltage range needed to design satellite power systems. According to the company, the 200-V model represents an industry first for space-grade GaN FET drivers. A block diagram (a) and application circuit (b) for the gate drivers are shown here.

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