High Density Discrete Solutions for Energy-Efficient DC-DC Automotive Applications

International Rectifier, IR® introduced the AUIRS2191S 600V driver IC and AUIRGP50B60PD1 600V non-punch-through (NPT) insulated gate bipolar transistor (IGBT) for use in energy-efficient DC-DC automotive applications.

The new devices feature fast switching speed and high power density making them well suited for use in high frequency DC-DC applications including high power DC-DC SMPS converters used in electric and hybrid electric vehicles.

The AUIRS2191S dual channel 600V driver IC enables independent control of the high- and low-side in a half-bridge topology. The device provides up to +3.5A/-3.5A (source/sink) current capability with very fast propagation delay times of 90ns (typical) making the switches highly responsive to driver command. The IC also features independent control of the high- and low-side to allow customization of dead time to minimize power loss and matched propagation delay on both channels. Operating junction temperature (Tj) up to 150°C and under-voltage lockout for both channels are also offered, in addition to Vss logic ground offset pin separated from COM power ground pin to provide higher immunity to transient shifts on COM voltage.

The AUIRS2191S IC features proprietary high-voltage integrated circuit (HVIC) and latch immune CMOS technologies to offer ruggedized monolithic construction. The output drivers offer a high pulse current buffer stage designed for minimum driver cross-conduction. The floating channel can be used to drive an N-channel power MOSFET or IGBT in the high-side configuration, operating up to 600 V. In addition, the devices feature benchmark negative voltage spike immunity for reliable operation even under extreme switching conditions and short circuit events.

The AUIRGP50B60PD1 600 V non-punch-through (NPT) insulated gate bipolar transistor (IGBT) is co-packaged (Co-Pack) with a 25 A ultra fast soft-recovery diode capable of operating at switching speeds up to 150 kHz, making it an ideal substitute for MOSFETs in high power SMPS applications. The new automotive-

qualified IGBT utilizes IR's thin wafer technology, which ensures shorter minority carrier depletion time and hence faster turn-off.

The device’s negligible turn-off tail current and low turn-off switching loss, or EOFF, enables designers to achieve higher operating frequencies. The improvements in switching performance, combined with optimized (positive) thermal coefficient characteristics and the lower gate turn-on charge, enable higher current density. Positive temperature coefficient ensures safe, reliable, high efficiency current sharing when operated in parallel.

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