

BMS Design Demonstrates Benefits Of Bidirectional GaN Transistor

[Innoscence Technology](#) has launched a new generation of battery management system (BMS) solutions based on its bidirectional VGaN technology. A 48-V, 180-A BMS demo is the latest Innoscence design solution to support a high-side same-port BMS application. This design adopts Innoscence's latest 100-V VGaN product, the INV100FQ030A, which is packaged in a 4-mm x 6-mm FCQFN and offers a maximum on-resistance of 3.2 m Ω . No heat sink is required with a maximum temperature rise of less than 50°C.

The 16-string charging and discharging battery protection system uses the controllable bidirectional conduction and cut-off features of VGaN, enabling four operational states: normal charging and discharging, charging protection, discharging protection, and sleep mode (see the figure).

Denis Marcon, general manager, Innoscence Europe explains the benefits. "With just 16 VGaNs, we can replace 18 pairs of silicon MOSFETs (36 in total), significantly reducing both the board area and system loop impedance. This optimization not only enhances performance and reduces system size but also drives down the overall system cost, making it a more efficient and cost-effective solution for battery protection systems," says Marcon.

Increased demand for convenient eco-friendly travel, mobile energy storage, and small power solutions, has driven rapid market developments. To improve battery safety and efficiency, battery protection system technology needs further advancement—GaN technology supports this by improving efficiency, power density and thermal performance, improving the overall conversion efficiency of power systems. With no parasitic body diode and bidirectional control, one bidirectional (VGaN) device can effectively replace two traditional MOS silicon pairs. Innoscence's VGaN series brings these advantages to both overvoltage protection (OVP) and BMS applications.

Innoscence's 48-V, 180-A high-side BMS solution is well suited for home batteries, portable charging station, e-scooters, e-bikes and similar applications, optimizing battery life and safety through efficient charge and discharge control. It reduces temperature rise and system costs while ensuring a compact, portable design. For more information, see the INV100FQ030A product [page](#) or contact the [company](#).

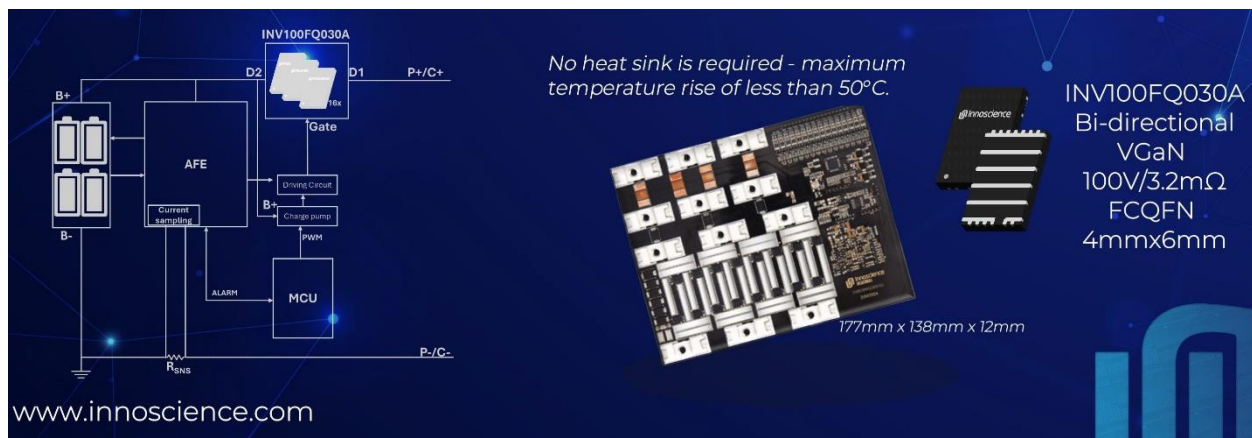


Figure. Leveraging the bidirectional capability of the INV100FQ030A VGaN device, a 48-V, 180-A battery management system demo replaces 36 traditional silicon MOSFETs with 16 bidirectional VGaN enhancement-mode power transistors. Use of the VGaN device reduces board area and system loop impedance.