ISSUE: June 2025

2000-V Rectifiers Improve Efficiency And Thermal Performance

WeEn Semiconductors' 2000-V high-voltage (HV) series standard rectifiers are said to achieve a 5% reduction in forward voltage drop (V_F) and a 20% improvement in thermal resistance compared to competing solutions. The innovations enable significant efficiency gains, lower cooling costs and extended operational lifespans in renewable energy storage and electric vehicle (EV) fast-charging applications, says the vendor.

Two initial variants are available: the 60-A-rated WND60P20W and the 90-A-rated WND90P20W. These devices are engineered to mitigate voltage spikes in fast-changing EV charging loads, safeguarding systems against failure while improving power density.

The 2000-V HV series integrates a proprietary single-chip design to minimize conduction losses with an optimized ORing circuit that enhances thermal management. This combination ensures reliable performance in 1500-V bus systems and 1000-Vdc EV charging infrastructure, where voltage spikes and stray inductance pose risks to component longevity.

Additional advantages include operating temperature with a T_{jmax} of 150°C, ensuring stability in demanding environments; superior surge current (I_{FSM}) tolerance, which enhances robustness under dynamic load conditions; and TO247-2L packaging, which streamlines integration into high-power designs (see the figure).

The 2000-V rectifiers are now available globally. Target applications include solar PV inverter and storage systems, dc fast EV chargers, and industrial power systems requiring high-voltage endurance and reliability.

Figure. "The WND90P20W and WND60P20W resolve critical thermal and efficiency challenges in next-gen renewable energy and EV charging systems," said Kevin Shen, president of WeEn Semiconductors. "By redefining voltage redundancy and thermal performance, we empower customers to deploy high-efficiency, low-maintenance solutions that outpace industry standards."