

# A Boost Converter With Capacitor Multiplier and Coupled Inductor for AC Module Applications

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The grid-connected AC module is an alternative solution in photovoltaic (PV) generation systems. It combines a PV panel and a micro-inverter connected to grid. The use of a high step-up converter is essential for the grid-connected microinverter because the input voltage is about 15 V to 40 V for a single PV panel. The proposed converter employs a Zeta converter and a coupled inductor, without the extreme duty ratios and high turns ratios generally needed for the coupled inductor to achieve high step-up voltage conversion; the leakage-inductor energy of the coupled inductor is efficiently recycled to the load. These features improve the energy-conversion efficiency. The operating principles and steady-state analyses of continuous and boundary conduction modes, as well as the voltage and current stresses of the active components, are discussed in detail. A 25 V input voltage, 200 V output voltage, and 250 W output power prototype circuit of the proposed converter is implemented to verify the feasibility; the maximum efficiency is up to 97.3%, and full-load efficiency is 94.8%.



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