Low Cost, High Efficiency PV Micro-Inverter System

Dong Cao, Shuai Jiang, Yuan Li and Fang Z. Peng

Abstract: In solar power plants, a modular micro-inverter integrated with each photovoltaic (PV) panel can reduce the overall system cost and increase the system reliability and MPPT efficiency. The traditional voltage-fed full-bridge dc-dc boost topology suffers high cost, low transformer efficiency and discontinuous input current problems. A current-fed half-bridge topology is utilized here with continuous input current, low cost and high efficiency features. A 210-W single-phase PV micro-inverter system with galvanic isolation is presented. By integrating micro-inverter to each PV panel, localized MPPT of each individual PV panel can be achieved, thus leading to higher system efficiency. The experimental results of the micro-inverter in grid-connected operation demonstrate high conversion and excellent MPPT efficiencies.

210 W Photovoltaic Micro-Inverter System

Specifications:
- Input Voltage: 31 ~ 62 V (dc)
- Output Voltage: 180 ~ 240 V (ac)
- Nominal Power: 210 W
- Peak Conversion Efficiency: 96%
- MPPT Efficiency: 99.7%
- Power Factor: > 0.99

Power Electronics and Motor Drives Laboratory
Contact Info: Fang Z. Peng, fzpeng@egr.msu.edu, 517-355-1608