Three-Level Current-Source PWM Inverter with No Isolated Switching Devices for Photovoltaic Conditioner

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Abstract	This paper presents a new configuration of a three-level current-source PWM inverter (CSI) with a fully common-source topology in terms of all FET switching devices. Using this common-source CSI, the number of gate drive power supplies can dramatically be reduced by using only a single power supply instead of a conventional bootstrap circuit or isolated power supplies. As a result, it can eliminate expensive transformers and capacitors in the drive circuits of the switching devices. In addition, the circuit can be operated at a higher switching frequency and a higher voltage because of its common-source topology. Design and operation principle of this new circuit were tested and analyzed using computer simulations. Finally, effectiveness of the proposed topology was experimentally verified by using a laboratory prototype set up. The simulation and the experimental results show that the proposed circuit works properly to generate the three-level output current.
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