

In this paper, a novel four-phase interleaved high step-down converter is presented. The proposed converter can provide an extremely high step-down voltage conversion ratio within a moderate duty cycle. There are four main advantages of the proposed converter. First, the blocking capacitors can store energy as usual. Therefore, they are used as voltage sources to reduce the input voltage as well as to reduce the switch voltage stresses. Second, due to the charge balance of the dc blocking capacitors, the converter possesses an automatic uniform current sharing characteristic of the interleaved phases without adopting any extra circuitry. Third, due to the phase shift between the interleaved phases, the architecture provides a low output current ripple. Fourth, the number of phases can be expanded or reduced to any even phases; therefore, the converter has a wide range of applications. Finally, the operating principles and analysis of this architecture are given, and an experimental prototype is also provided to verify the effectiveness of the proposed converter.