

THE STUDY OF SINGLE PHASE DIODE RECTIFIERS WITH HIGH POWER FACTOR AND LOW TOTAL HARMONIC DISTORTION

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ABSTRACT

The mains current in an ac/dc converter contains periodic current pulses due to the action of rectifier and output filter capacitor. The high current peaks cause harmonic distortion of the supply current and low power factor. This results in a poor power quality, voltage distortion, poor power factor at input ac mains, slowly varying rippled dc output at load end and low efficiency. Many input wave shaping methods have been proposed to solve the problem of poor power factor which can be classified as active and passive methods. The main focus of this study is to review various existing wave shaping methods in terms of their efficiency, total harmonic distortion and power factor. Among the passive wave shaping techniques, the improved passive current wave shaping method and the novel method are analyzed and are simulated in ORCAD software. The active method which uses a MOSFET switch driven by the rectangular pulses of continuously varying duty cycle over a period of supply voltage is analyzed. The relevant theoretical design parameters and the simulated results are presented.