非絶縁型および絶縁型直接 AC-DC 変換回路

The Non-isolated and Isolated Direct AC-DC Converter Design

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The conventional AC-DC converter is bulky, costly and of low efficiency, because it uses three stages of devices. In this paper, we propose to use switching-mode DC-DC converters to realize direct AC-DC conversion. In our proposed converters, the rectifier is no longer a separated part, but it is realized directly by the DC-DC converter with less or even no rectifier components like diodes. We apply the switching DC-DC converter topology to our proposed several AC-DC converters (e.g., buck–buck AC-DC converter (Fig.1) and forward isolated AC-DC converter (Fig.2)). We explain their operation principles and show their simulation and experimental results. Our experimental results show that stable DC voltage output and fast transient response are realized with our buck-buck AC-DC converter.

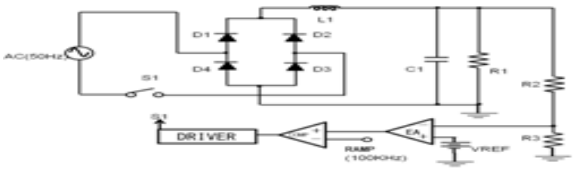

Fig.1. Non-isolated direct AC-DC converter.

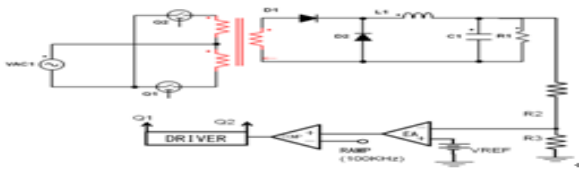

Fig.2. Isolated direct AC-DC converter.