

## Design and Development of Compact 1KW Floating Battery Discharge Regulator

**Authors :** A. Sreedevi, G. Anantaramu

**Abstract :** The present space research organizations are striving towards the development of lighter, smaller, more efficient, low cost, and highly reliable power supply. Switch mode power supplies (SMPS) overcome the demerits of linear power supplies such as low efficiency, difficulties in thermal management, and in boosting the output voltage. Space applications require a constant DC voltage to supply its load. As the load varies, the battery terminal voltage tends to vary accordingly. To avoid this variation in the load terminal voltage, a DC-DC regulator is required. The conventional regulator for space applications is isolated boost topology. The proposed topology uses an interleaved push-pull converter with a current doubler secondary to reduce the EMI issues and increase efficiency. The proposed topology uses a floating technique where the converter derives power from the battery and generates only the voltage that is required to fill the gap between the bus and the battery voltage. The direct voltage sense and current loop provide tight regulation of output and better stability. Converter is designed with 50 kHz switching frequency using UC 1825 PWM controller employing both voltage and peak current mode control. Experimental tests have been carried out on the converter under different input and load conditions to validate the design. The experimental results showed that the efficiency was greater than 91%. Stability analysis is done using venable stability analyzer.

**Keywords :** push pull converter, current doubler, converter, PWM control

**Conference Title :** ICPEPQM 2020 : International Conference on Power Electronics and Power Quality Management

**Conference Location :** Tokyo, Japan

**Conference Dates :** December 03-04, 2020