

IAF SPACE POWER SYMPOSIUM (C3)
Advanced Space Power Technologies (3)

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DESIGN AND ANALYSIS OF A DC/DC BUCK CONVERTER WITH LOAD SWITCH FOR
EDUCATIONAL NANOSATELLITE POWER SUB-SYSTEMS.**Abstract**

The integration of a load switch with a DC/DC buck converter using LM2596 for power distribution in low-cost educational nanosatellites is a technique that aims to efficiently manage the power distribution system in these small spacecrafts. The converter is based on the LM2596 regulator and designed to step down the input voltage of +16.8V to +12V, +5V and +3.3V output, which are suitable for the nanosatellite's various subsystems. The load switch is based on MOSFET and used to turn on or off the power supply to a particular load and protect the nanosatellite from power surges. A prototype of a +12V DC/DC buck converter with a high side load switch has been realized and tested, which meets our requirements and shows a good efficiency of 89%. In addition, the prototype features a capacitor between the source and gate of the MOSFET, which has effectively reduced the inrush current, demonstrating the effectiveness of this approach in reducing surges of current when the load is connected. The output current and voltage were measured at 0.7A and 11.89V, respectively, making this design suitable for use in low-cost educational nanosatellites. Keywords: DC/DC Buck converter, Load switch, LM2596, Electrical Power subsystems, nanosatellite, inrush current