syncroness
innovative product development

INNOVATION = DESIGNING DUAL SWITCH FORWARD CONVERTERS FOR HIGH-POWER ELECTRONICS

INNOVATION AT A GLANCE

Technology:
Dual Switch High-Power Forward Converters

Industry:
Industrial Instrumentation

Syncroness Services:
- Component Evaluation/Qualification
- Electronic Analysis
- High Power Testing

Objectives:
- Provide confident design approach
- Identify best path forward
- Evaluate and compare available design input options

Approach:
- Identify multiple available solutions
- Create custom test bed for efficient evaluation
- Conduct trade study to rank options

RESULTS

- Reduced time to solution
- Increased confidence in design approach
- Informed decision making
- Ease of implementation for future efforts

Complex high-power designs don't need to be expensive and time consuming. Evaluation of available options and optimized analysis methods allow Syncroness to identify and implement designs quickly and safely.

FOCUSING ON THE CORE PROBLEM TO BE SOLVED, WE ARE ABLE TO PROVIDE COMPREHENSIVE TRADE STUDIES TO ESNURE THE RIGHT SOLUTION IS IMPLEMENTED.

As a developer of complex electrical designs, we receive a great deal of requests for high power applications. When a customer approached us to develop a Forward Converter topology power supply set from 400 watt to 900 watt output levels, we determined an in-house analysis of available component options would be the shortest path to identifying a cost-effective and reliable design as opposed to a completely custom design or higher-risk trial-by-error approach.

An initial survey of the latest and greatest integrated circuit controllers from multiple trusted suppliers was completed while emphasizing readily available, suitable semiconductor and magnetic components to support circuit designs at the required power levels.

Back in our lab, a test bed was built to evaluate the components in a two transistor forward converter topology. The basic transformer stage was evaluated without selection of a controller by driving the circuit gate drivers, transformer and 500 volt primary MOSFETS via a signal generator. This allowed us to manually adjust the Pulse-width Modulation (PWM) signals. Our team then built a custom power transformer designed to support power conversion of nominal 400 volt DC Link voltages to 40 volts DC output at 20 amps. This setup allowed us to facilitate a complete evaluation and comparison of secondary side rectification using traditional diodes rather than a synchronous MOSFET rectification workflow.

Running this analysis was done quickly using mostly in-house components and equipment. It allowed us to provide our client with a complete trade study where each option was presented in the context of cost, complexity, reliability and thermal performance. We were also able to provide thermal and reliability performance measures for the primary side MOSFET circuitry.

This method of evaluation allowed Syncroness to provide confident, data-backed recommendations to our client, and can also be leveraged for future high power projects. The informed decisions have led to reduced cost and better product development forecasting.

LET'S KEEP INNOVATING.

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