

GR-24-01 – 120Kva Three-Phase Grid-tied Inverter with Active Controlled Parallel SiC MOSFETs

1. Company or University Name, as well as partnering organizations

University of Arkansas

2. Project Title

GR-24-01: 120kVA Three-Phase Grid-tied Inverter with Active Controlled Parallel SiC MOSFETs

3. Project PI/Contact

Dr. H. Alan Mantooth

4. Technology Roadmap Target Area (choose one or more)

1. Power Devices and Modules 2. Power Electronics Systems

5. Project Summary

The intended inverter aims to bolster power quality, facilitate harmonic compensation, and enable advanced functionalities in grid-tied applications. It leverages the superior switching frequency (over 50 kHz) and robust voltage management (800 V DC bus) capabilities of SiC MOSFETs.

6. Technology Gap/Market Need

Utilizing distributed energy resources and wide bandgap power devices offers enhanced power capacity, superior functionalities, and optimized costs.

7. Target Application (where does it fit in?)

Modeling and Control; Circuits and Converters; Smart Inverters; Power Flow Control

8. Accomplishments/Deliverables

(1) Design an active gate driving system into parallel SiC MOSFETs for closed-loop current balance and switching behavior optimization. (2) Design a three-phase power stage board with integrated high-bandwidth (> 10 MHz) switch current sensors.

9. Impact/Benefits

The successful execution of this project will pave the way for the extensive application of both grid systems and WBG devices.

10. Images

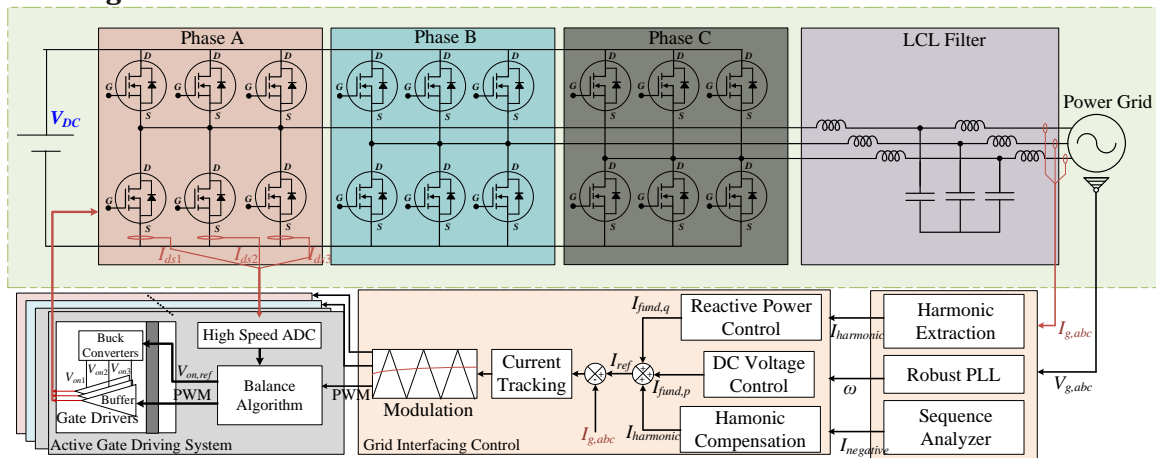


Fig. 1. Overall system structure of the proposed three-phase inverter.