

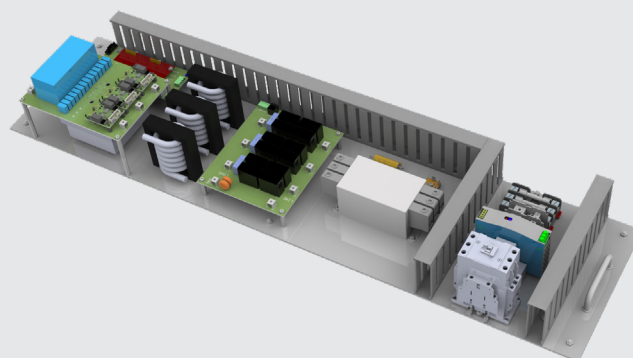


# 25kW Silicon Carbide Active Front End (AFE) CRD25AD12N-FMC

## WOLFSPEED WOLFPACK™ REFERENCE DESIGN Featuring CCB021M12FM3

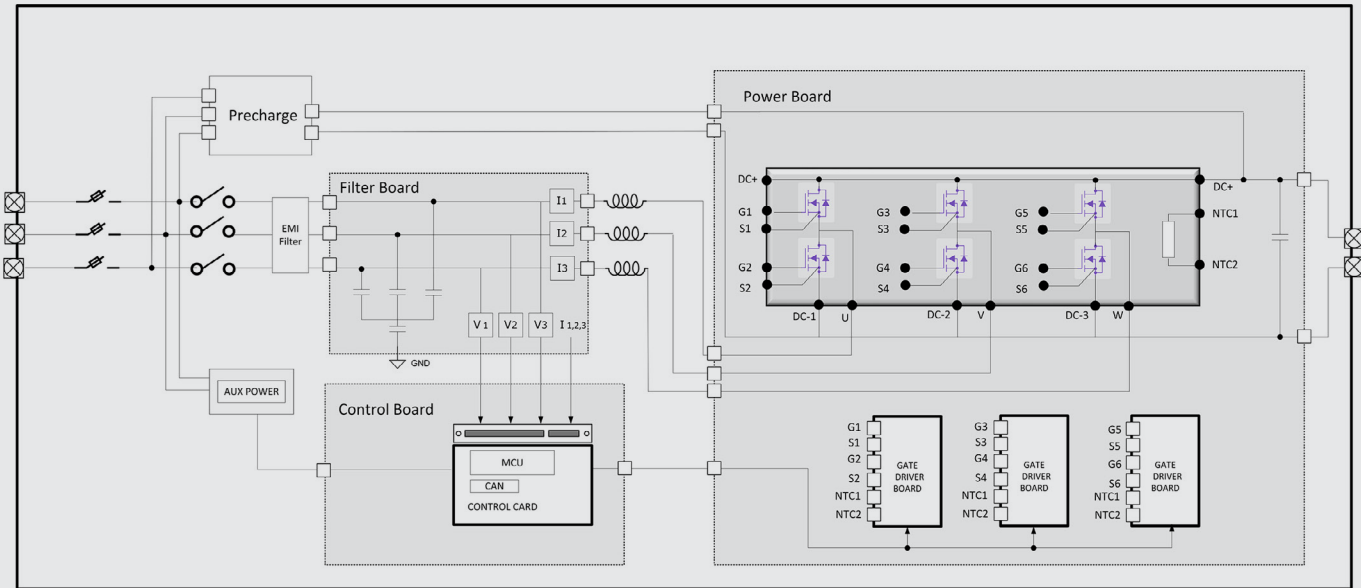
This reference design demonstrates the application of the Wolfspeed WolfPACK™ power module to create a bidirectional high-power density Active Front End (AFE) that can be applied to electric vehicle (EV) fast charging, industrial motor drives, power supplies, and renewable energy applications. The design is ideal for scaling up to higher power levels by interleaving multiple 25 kW AFEs.

The use of a single power module with an isolated substrate simplifies the system design with commonly used thermal management techniques. The use of Wolfspeed's third generation C3M MOSFETs enables high switching frequencies and faster switching speeds resulting in increased control bandwidth and power factor as well as smaller magnetics and DC bus capacitors.



Parameter	Specification [Units]	Notes
$P_{OUT}$	25 kW	$T_A = 25^{\circ}\text{C}$ , 480 VAC PF=1, $F_s = 100$ kHz
$V_{DC}$	800 V <sub>DC</sub> nominal	900 V Maximum
$F_{SW}$	100 kHz	Controller-tuned
$I_{PHASE}$	30 A <sub>AC, RMS</sub>	$T_A = 25^{\circ}\text{C}$ , 480 VAC PF=1, $F_s = 100$ kHz

# System Block Diagram



## FEATURES

Power stage utilizing Wolfspeed  
WolfPACK™ power module

Line-side protection circuitry

Pre-charge circuit

EMI filter and line filter PCB

Controller PCB implementing  
closed-loop control

Custom inductors



## BENEFITS

Reduced system losses

Increased power density



## APPLICATIONS

Electric vehicle (EV) fast charging

Industrial motor drives

Power supplies

Renewable energy