



Wolfspeed C3M™ Silicon Carbide (SiC) MOSFETs - From 650V to 1200V

C3M™ MOSFETs enable higher switching frequencies, increase efficiency and reduce the size and number of components

Wolfspeed, A Cree Company, is the industry leader in SiC MOSFETs with the broadest portfolio of commercially released products. The C3M™ product portfolio is optimized for high-frequency power electronic applications. This includes industrial motor drives, industrial power supplies, battery chargers, Uninterruptible Power Supplies (UPS), renewable-energy inverters, electric vehicle charging systems and more. The C3M™ portfolio is the most advanced and reliable MOSFETs available in the market today and has rapidly become a key building block for new power conversion systems with higher efficiency and less wasted heat, making them more robust, smaller in size, and lighter in weight.

The C3M™ portfolio includes 650V, 900V, 1000V, and 1200V options in multiple package choices. A broad range of on-resistance ratings enable designers to choose the right part for their applications. The new 650V series enables smaller and higher-efficiency next-generation power conversion systems at cost parity with silicon-based solutions. The C3M™ MOSFETs are compatible with a wide range of Analog Devices gate drivers to enable efficient power designs for many applications. With the integration of advanced features, the ADI gate drivers provide the utmost control over the switching characteristics of C3M™ MOSFETs.

Key Benefits

- > Improved system efficiency with lower switching and conduction losses
- > Support for higher switching frequency operation
- > Improved system-level power density
- > Reduced system size, weight, and cooling requirements
- > New hard switching topologies (Totem-Pole PFC) possible

Key features of the C3M™ MOSFET technology:

- > Easier to drive (+15V gate drive)
- > Stable Rds(on) over temperature
- > Rugged body diode (no need for external diode)
- > Avalanche ruggedness
- > Available in new package options with separate Kelvin source pin

Wolfspeed C3M™ SiC MOSFET Applications



Renewable Energy

Wind power, solar power and energy storage systems



Industrial

Power supplies, EV charging, UPS, commercial inductive heating, battery chargers and motor drives



Automotive

Off-board DC fast charger, on-board battery charger, EV powertrain and auto lighting

Analog Devices Gate Driver ICs for Wolfspeed C3M™ SiC MOSFETs

Analog Devices (ADI) gate drivers complement the higher switching speeds, voltage and current levels of Wolfspeed C3M™ MOSFETs. Find compatible products in the table.

C3M™ MOSFETs	Package	Basic				Protecting	Programmable	
		ADuM4120	ADuM4121	ADuM4122	ADuM4221	ADuM4135	ADuM4137*	ADuM4138*
650V	D, K, J	C	C	C	H, R	P	P	P
900V*	D, K, J	C	C	C	H	P	P	P
1000V	J, K	C	C	C	H	P	P	P
1200V	D, K, J	C	C	C	H	P	P	P

* - Automotive qualified version available
D- Package TO-247-3

K- Package TO-247-4
J- Package TO-263-7

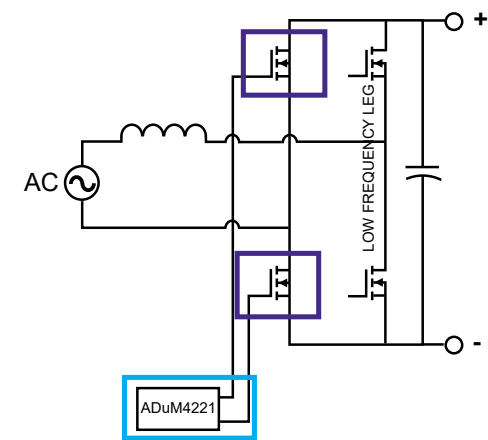
R- Reference design exists
C- General companion recommendation

H- Preferred from half-bridge configuration
P- Preferred when paralleling switched

Common Topologies for Wolfspeed MOSFETs with ADI Gate Drivers

Bridgeless PFC Design

The elimination of bridge rectifiers ensures low conduction losses, high power density, low THD, and low common-mode noise. Further, this topology uses the fewest components, saving space and providing designers with added flexibility.



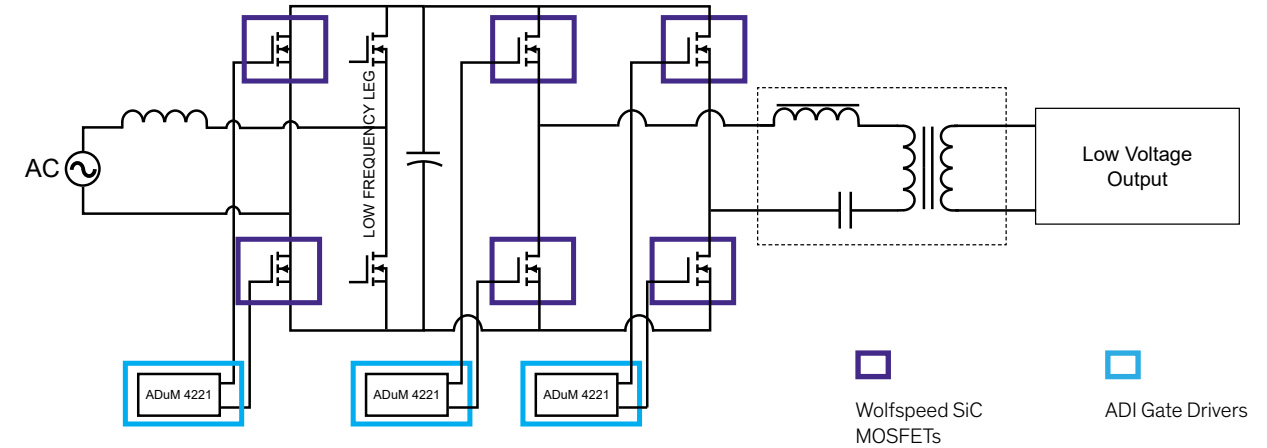
Applications

- > Server power supplies
- > Industrial motor control
- > Industrial power conversion
- > Energy storage systems

Wolfspeed SiC MOSFETs
ADI Gate Drivers

Industrial AC/DC PFC + DC/DC

Benefits of this topology include: Reduction in overall energy consumption, higher efficiency, improved thermal performance and reductions in size and weight of the power supply.

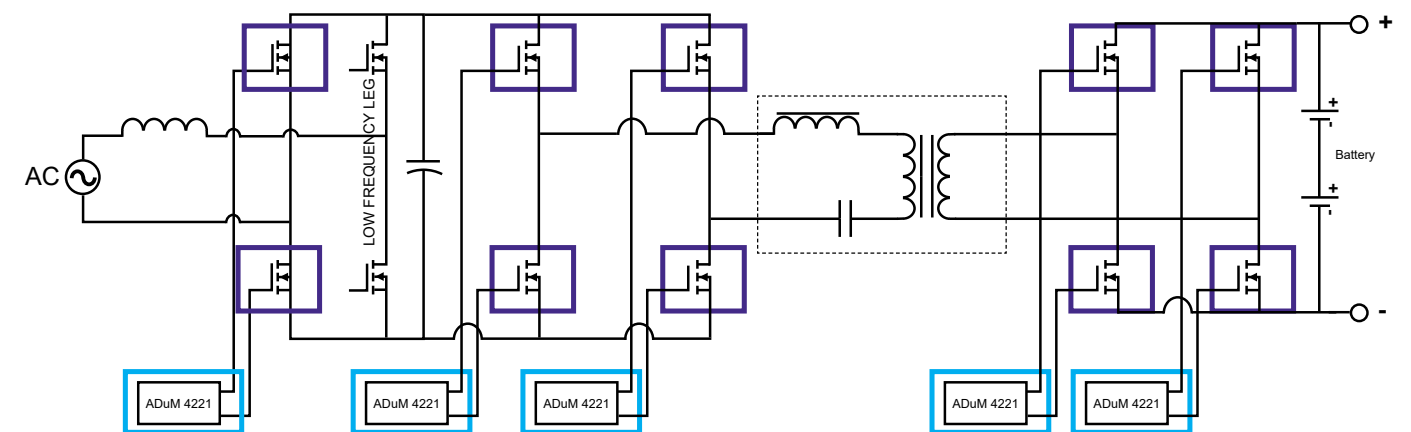


Industrial applications

- > Welding PFC
- > Industrial induction heating: Load switch
- > Industrial battery chargers
- > Trains/traction
- > Motor drives
- > Commercial inductive heating

Bi-Directional Energy Storage

Benefits of this configuration include: Lower circuit complexity, high efficiency and power density, improved thermal performance and bi-directional power flow capability (battery-to-grid).



Energy applications

- > On-board DC/DC converter
- > Bi-directional battery chargers
- > Grid-tied distributed generation
- > Energy storage systems
- > Uninterruptible Power Supplies (UPS)

Wolfspeed SiC MOSFETs
ADI Gate Drivers

Wolfspeed and ADI combine market leading MOSFETs and Gate drivers to deliver high efficiency and high reliability system solutions across industrial, energy and automotive applications. These solutions are backed by industry-relevant reference designs, evaluation platforms and hardware design packages, along with joint applications support through Arrow.

Wolfspeed SiC MOSFET Portfolio Overview

Part Number	Blocking Voltage (V)	$R_{ds(on)}$ (m Ω)	Current Rating at 25 °C (A)	Package
C3M0015065D	650	15	120	TO-247-3
C3M0015065K	650	15	120	TO-247-4
C3M0060065D	650	60	37	TO-247-3
C3M0060065K	650	60	37	TO-247-4
C3M0060065J	650	60	36	TO-263-7
C3M0030090K	900	30	63	TO-247-4
C3M0065090J	900	65	35	TO-263-7
C3M0065090D	900	65	36	TO-247-3
E3M0120090D	900	120	23	TO-247-3
C3M0120090J	900	120	22	TO-263-7
C3M0120090D	900	120	23	TO-247-3
C3M0280090J	900	280	11	TO-263-7
C3M0280090D	900	280	11.5	TO-247-3
E3M0280090D	900	280	11.5	TO-247-3
C3M0065100K	1000	65	35	TO-247-4
C3M0065100J	1000	65	35	TO-263-7
C3M0120100K	1000	120	22	TO-247-4
C3M0120100J	1000	120	22	TO-263-7
C3M0016120K	1200	16	115	TO-247-4
C3M0021120K	1200	21	100	TO-247-4
C3M0021120D	1200	21	100	TO-247-3
C3M0032120D	1200	32	63	TO-247-3
C3M0032120K	1200	32	63	TO-247-4
C3M0075120D	1200	75	30	TO-247-3
C3M0075120K	1200	75	30	TO-247-4
C3M0075120J	1200	75	30	TO-263-7
C3M0160120D	1200	160	19	TO-247-3
C3M0350120D	1200	350	7.8	TO-247-3
C3M0016120D	1200	16	115	TO-247-3
C3M0160120J	1200	160	19	TO-263-7
C3M0350120J	1200	350	7.8	TO-263-7

Voltage ranges: 650V-1200V

$R_{DS(ON)}$: 15-350 m Ω

Current: 5-120A



TO-247-3



TO-247-4



TO-263-7

Getting Started Resources:

- > [SiC MOSFETs](#)
- > [Reference design: 6.6 kW High Frequency DC-DC Converter](#)



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