



## Application Brief

### Three Phase Motor Driver Inverter

#### SiC MOSFETs improve efficiency of the newer Solid State motors

Analog Power Conversion Electronics, LLC

#### Applications

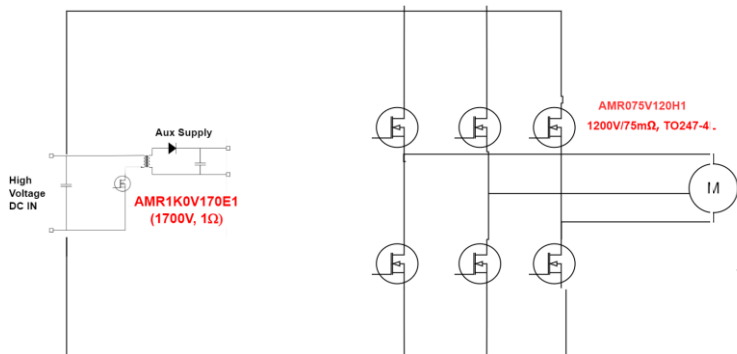
- Motor drives
- PCB Motor Stators
- HVAC
- Robotics
- EV
- Medical Devices

#### Highlighted Products \*\*\*

- **AMR1K0V170E1** – SiC MOSFET, 1700V, 1Ω, TO-247 (For Aux Supply)
- **AMR075V120H1** – SiC MOSFET, 1200V, 75mΩ, TO-247

#### SiC MOSFET Benefits

- High withstand voltage and low Rds(on) make it ideal for Auxiliary Supplies.
- High Temp Operation – 175°C
- High frequency operation reduces size of components including magnetics
- Lower device capacitances with Fast Body Diode reduces switching losses



#### Why APC

- State of the Art SiC manufacturing per latest Industry standards
- Amongst industry's shortest lead time
- Designed in the U.S., Built in the Philippines.

#### Background

Solid State Motors, more specifically called **PCB axial flux motors**<sup>[1]</sup>, is an electric motor that uses a **printed circuit board (PCB) as the stator**. These motors are shorter and wider than equivalent radial motors, and they can be built directly upon a PCB, using PCB traces as the stator windings. PCB stator motors are lightweight and deliver more power in a smaller package. Thus they are well suited as our industry becomes more electrified serving robotics, HVAC, electric vehicles, medical devices, industrial automation, aerospace and defense, renewable energy and consumer electronics. Most traditional motor drives employ IGBTs as they are cost effective and ruggedized. However they suffer from high switching losses so they need to operate at lower frequency which increases size and weight of the motor. With Solid State Motors the use of higher speed SiC devices can now be used. Relative to silicon IGBTs they have the advantage of operating at much higher frequency while increasing system efficiency and reducing size and weight of the motor. <sup>[2][3][4]</sup>

#### References

[1] Wikipedia - [PCB axial flux motors](#), [2] [Infinitum Electric](#), [3] [ECM](#), [4] [EV Adoption of Axial Motors](#)

\*\*\* You can purchase samples of Luminus Power Semiconductor products [here](#). Our authorized distributors are Avnet Electronics, Mouser and Digikey.



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Rev 1.0, February 2025