ALLEGRO microsystems

SLIENT POWER BEHIND EVERY WASH

Driving Efficiency and Precision in Modern Washing Machines and Dryers

The home appliance market is undergoing a transformation, with consumers demanding laundry solutions that are not only powerful and effective but also energy-efficient, quiet, and intelligent. For engineers, the challenge is to design machines that handle heavy loads with precision while minimizing noise and vibration, all within a compact and cost-effective footprint. This requires significant advancements in motor control, position sensing, and power management technologies.

Next-generation laundry appliances must deliver consistent cleaning and drying performance while minimizing noise and vibration for the best user experience. Achieving this demands high-efficiency BLDC motor control, precise torque management, and accurate current feedback for smooth transitions across wash, spin, and drying cycles. Furthermore, energy efficiency regulations and smart features, such as predictive maintenance and adaptive spin balancing, require advanced inverter architectures and robust sensing that can withstand moisture, detergents, and vibration. Reliable operation is therefore critical for every subsystem, from the main drum motor and heating element to the water pumps and user interface.

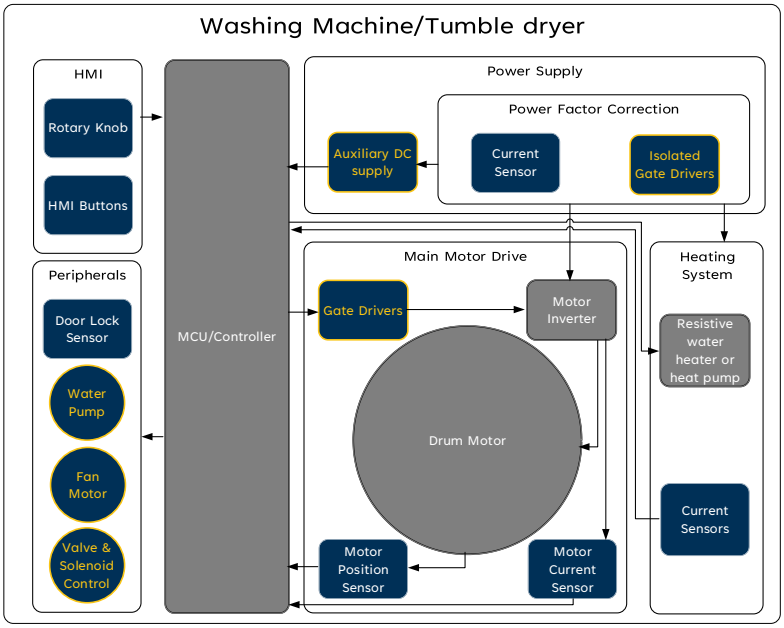
What you can achieve with Allegro solutions

- Quiet & Efficient Operation: Our motor drivers feature advanced FOC algorithms and sinusoidal drive capabilities that significantly minimize audible noise and vibration, while optimizing energy efficiency
- Enhanced Safety & Durability: Integrated reinforced isolation in gate drivers and current sensors protect sensitive electronics and users from high-voltage systems. Additionally, contactless magnetic sensors offer a waterproof, rust-proof solution for door locks and buttons, ensuring reliability throughout the product's life
- Simplified Design & Reduced Cost: Highly integrated solutions, such as our "PowerThru" isolated gate drivers and compact current sensors, eliminate the need for bias supplies and shunt resistors. This shrinks PCB size, simplifies layout, and lowers the overall Bill of Materials (BOM)

As robotic lawnmowers innovate to meet consumer demands for convenience and performance, the underlying technologies that power them become increasingly critical.

Allegro Microsystems' advanced magnetic sensors, motor drivers, and power ICs provide the precision, robustness, and reliability required for consistent performance in a demanding outdoor machine.

Block Diagram



Key Products and Solutions

Subsystem	Component	Allegro Parts	Key Differentiator
Power	Over Current Detection	CT4022	Isolated, 500kHz, ultra-low noise TMR
	Power Switch Driver	A3942	4.5 to 60V, High-side MOSFET gate driver
Cart Sensing Array	Regulator	APM81815	48V, 4x4x2mm package with integrated components
	Linear Magnetic Sensor	A139x (1D)	User selectable sleep mode and quick wakeup
		ALS31300 (3D)	12-bit output, 0.7% accuracy error, ideal for 3-axis
		A31301 (3D)	Lower noise 3D solution
Cart Motor System	Regulator	APM81815	48V, 4x4x2mm package with integrated components
	Coil Array Driver	A89500	48V Half-Bridge Driver (100V max), small form factor
	Current Sensor	ACS37041	Compact SOT23-W, 1.6mΩ conductor resistance
Main Controller	Regulator	APM81815	48V, 4x4x2mm package with integrated components
	PMIC	A81411	3.2 to 36V, High safety, SPI

To learn more about the Allegro family of products and to explore available design resources, visit allegromicro.com