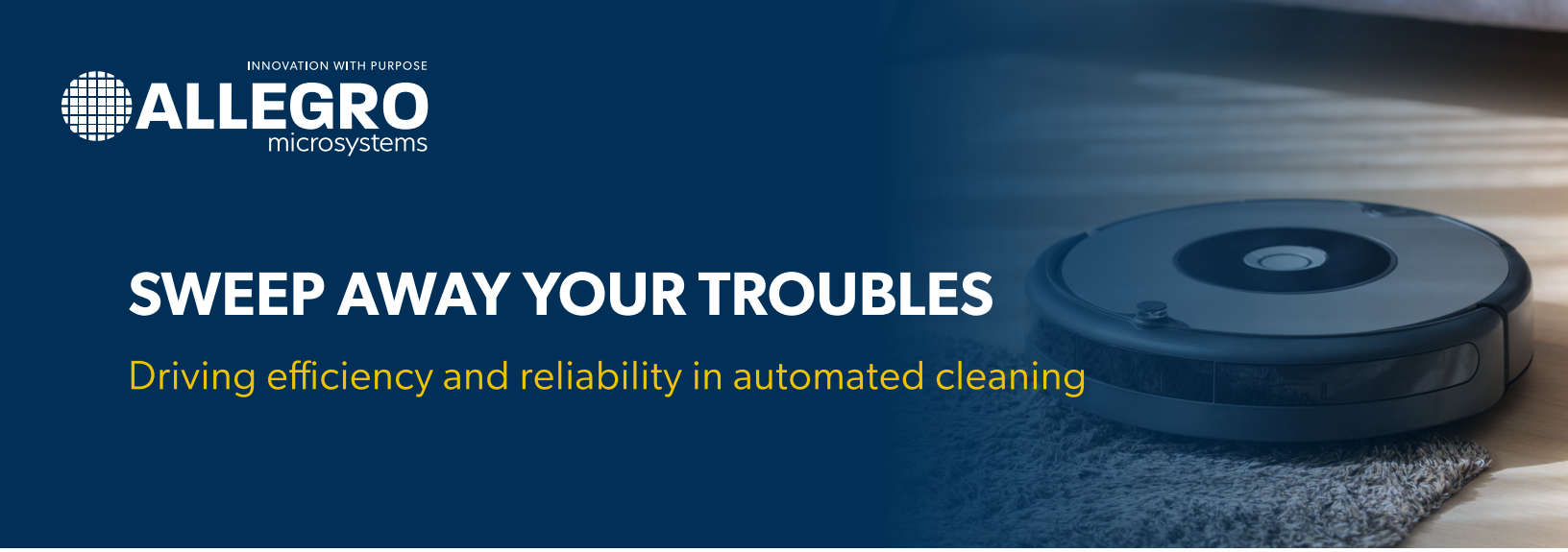
INNOVATION WITH PURPOSE
ALLEGRO microsystems



SWEEP AWAY YOUR TROUBLES

Driving efficiency and reliability in automated cleaning

Robot vacuums have evolved far beyond their initial role of simple floor cleaning; they are now sophisticated multi-tasking machines. For engineers, the challenge lies in developing next-generation vacuum robots that deliver superior performance and longevity. This requires significant advancements in critical areas such as position sensing, current sensing, and motor control.

Position sensing fulfills a variety of functions, such as bumper collision detection, motor commutation, wheel speed measurement, and lid closure. Magnetic position sensing offers a contactless solution to these features in a compact package, ensuring that dirt and debris will not interfere with operation. Another key component is the motor drivers, which control the motors for suction, mobility, and sweeping. Allegro offers a diverse line of motor drivers to support various functions within the vacuum robot, while addressing system-level concerns such as noise performance and size reduction.

What you can achieve with Allegro solutions

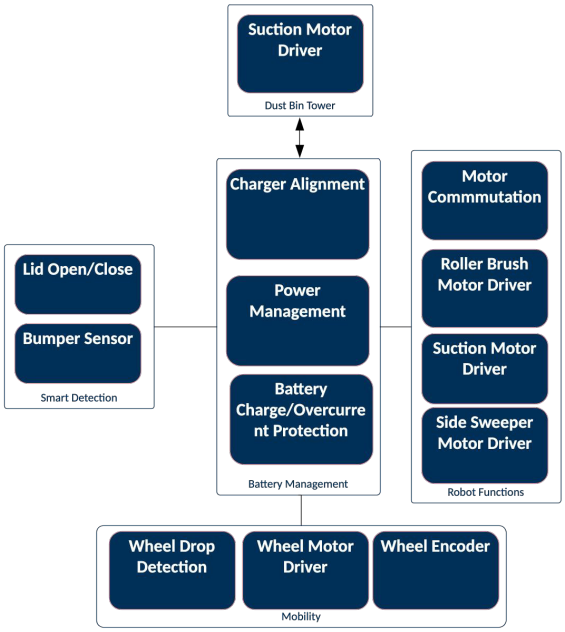
- **Efficiency:** Hall-effect latches provide position and speed feedback to motor drivers to enhance motor efficiency by optimizing power delivery, minimizing energy losses, and ensuring precise motor control.
- **Solution Size Reduction:** Highly integrated solutions in small packages optimize design layout, facilitating more compact and effective robotic systems without compromising on capability or reliability.
- **Robustness:** Magnetic position sensors offer a contactless solution that are not affected by environments with dust and debris. These solutions are not susceptible to wear and tear unlike mechanical switches. Hall sensors are solid-state devices with no moving parts, which make them highly resistant to mechanical vibrations and shocks.

As robot vacuums evolve to meet ever-increasing consumer demands for performance and convenience, the underlying technologies that power these smart cleaning devices become increasingly critical.

Allegro Microsystems' advanced magnetic position sensors and motor drivers provide the precision, reliability, and robustness required for consistent performance in an automated machine.

Market-Leading Portfolios that Sense, Regulate and Drive

Block Diagram



Key Products and Solutions

Subsystem	Component	Allegro Parts	Key Differentiator
Overcurrent Protection	Current Sensor	ACS71240	Low-footprint current sensor that is easy to integrate and operates with low ohmic losses for longer battery life
Wheel Motor Driver	Brushed DC MotorDriver	A4950, A4952, A4953	Motor driver with internal synchronous rectification that lowers power dissipation for longer battery life
Side Sweeper Motor			
Roller Brush Motor			
Wheel Motor Encoder	Hall Latch	A1262	Durable latch whose 2D architecture simplifies encoder design, reducing device footprint
Vacuum Fan	BLDC Controller	A89303	Sensorless motor driver with trapezoidal control and integrated MOSFETs with high speed and quick startup
Bumper Sensor	1D Linear Sensor	A139x	Position sensor that requires very little current to maintain sensitivity, allowing longer system battery life
Wheel Gravity Detection	Hall Switch	APS11753	Micropower option with low switch points that work with smaller magnets. Push pull output for energy savings
Lid Open/Close			
Charging Contact Alignment			
BLDC Commutation	Hall Latch	APS12202	Latch that is resistant to physical and thermal stress, ensuring consistent performance in harsh conditions
Power Management	DC/DC Regulator	A8586	Versatile buck regulator for low voltage operation, with low quiescent current and extensive circuit protection for longer battery life

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