INNOVATIVE MOTOR CONTROL:
SETTING A NEW STANDARD FOR MOTOR DRIVE TECHNOLOGY
At Allegro MicroSystems, we’re passionate about developing intelligent solutions that move the world toward a safer and more sustainable future – while giving our customers a competitive edge. With more than 50 years of experience developing advanced semiconductor technology and application-specific algorithms, Allegro is a global leader in power and sensing solutions for motion control and energy-efficient systems.

With decades of experience, our embedded motion control algorithms in our motor driver ICs simplify designs while improving motor performance and time to market.

Allegro plays a key role in enabling brushless DC motor adoption by simplifying the complexities of electronic commutation. We offer a range of products targeted at BLDC applications which span the industrial, consumer and computer markets (IC&C). Our broad offering of products developed to ISO 26262 helps our customers meet new safety-critical requirements.

**A Flexible Solution Without Software**

More demanding customer requirements have created a shift in motion control design that favors flexibility and improved time to market. Using Allegro’s hardware-based algorithm, the solution is “plug-in and spin”, eliminating the cycle of software development and debug and significantly reducing time to market. Flexibility is achieved by implementing a simple to use Graphical User Interface (GUI). Now, high performance and full-featured sensorless control is just a few mouse-clicks away.

**Features**

- Sensorless sinusoidal commutation
- Self-commutating hall-based drive with integrated state machine
- Back EMF sensing capability
- High-powered gate drive with advanced diagnostics and verification
- Features to support ASIL D safety goal compliance
- Closed-loop speed and torque control
- Wettable flank for Auto QFN

**Applications**

- Electronic power steering (EPS, EHPS, EAS)
- Pumps/fans/blower
- E-Turbo
- ISG (Integrated Starter Generator)
- Variable Valve Timing
- Power tools: drills, grinders, impact wrenches
- Lawn and garden equipment: lawn mowers, leaf blowers
- Household: robotic vacuums
- Pumps: Dish and clothes washer pumps
# Featured Products

<table>
<thead>
<tr>
<th>Device</th>
<th>Features</th>
<th>Image</th>
</tr>
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<tbody>
<tr>
<td>A5932 - Three Phase Sinusoidal Sensorless Fan Controller</td>
<td>5 V to 50 V operating voltage range - wide operating supply voltage range for variety of applications</td>
<td><img src="image1.png" alt="Image" /></td>
</tr>
<tr>
<td>A5947 - Three-Phase Sensorless Fan Driver IC</td>
<td>Sinusoidal Drive Closed-Loop Speed Control EEPROM Programmability</td>
<td><img src="image2.png" alt="Image" /></td>
</tr>
<tr>
<td>A4919 - Three Phase MOSFET Driver with Integrated Regulator</td>
<td>Integrated LDO for microprocessor supply</td>
<td><img src="image3.png" alt="Image" /></td>
</tr>
<tr>
<td>AMT49413 - High Power BLDC MOSFET Controller with Integrated Hall Commutation</td>
<td>PWM control with TACH output, integrated current control</td>
<td><img src="image4.png" alt="Image" /></td>
</tr>
<tr>
<td>A4910 - Automotive 3-Phase MOSFET Driver</td>
<td>Direct control with 3 independent current sense amplifiers</td>
<td><img src="image5.png" alt="Image" /></td>
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# Featured Safety Automotive Products

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<tbody>
<tr>
<td>A4918 - Automotive Three-Phase MOSFET Driver</td>
<td>Three current sense amplifiers, industry leading diagnostics</td>
<td><img src="image6.png" alt="Image" /></td>
</tr>
<tr>
<td>A4916 - Automotive Three-Phase MOSFET Driver</td>
<td>Industry leading diagnostics</td>
<td><img src="image7.png" alt="Image" /></td>
</tr>
<tr>
<td>AMT49105 - Highly Integrated ASIL BLDC MOSFET Driver IC</td>
<td>Integrated Lin Phy, LDO for microprocessor supply, watchdog, current sense amplifier and back emf comparators</td>
<td><img src="image8.png" alt="Image" /></td>
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</table>
Really quiet. Easy to implement. Extremely efficient. Allegro’s QuietMotion family offers the first-to-market Field Oriented Control (FOC) brushless DC (BLDC) electric motor controllers that are customer code-free.

The devices are designed to provide reliable and efficient low audible noise performance while reducing design cycle time with simple parameter settings through an easy to use GUI.

**Featured Products**

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| **AMT49406** - Code-Free FOC Sensorless BLDC Motor Controller | - Zero reverse rotation  
- Low audible noise | ![AMT49406 Image] |
| **A89301** - Ultra-Quiet, Code-Free, FOC Sensorless BLDC Motor Controller | - Optimized for low speed  
- Zero reverse rotation  
- Low audible noise | ![A89301 Image] |
| **AMT49400** - Integrated Sensorless FOC BLDC Driver | - Low audible noise  
- Optimized for 12 V systems  
- 2 A Over Current Protections | ![AMT49400 Image] |

**Features**

- Closed Loop Speed Control
- Automatic Phase Advance
- Non-Volatile EEPROM Configuration
- Low Audible Noise and Vibration
- Low Power Standby Mode
- Programmable PWM mapping
- Short Circuit Protection

**Applications**

- Small Appliance Blower and Air Purifier
- Suction Motor Robotic Vacuum
- Computer cooling
- Large Server Fan
- HVAC, Dehumidifier, and Air Purifier
- Drone Motor
- Upright Vacuum
- Water Pump
Brush DC motors are the most widely used drivers due to their low cost and simple drive control options. Typical brush DC motor drivers consist of a half bridge for a single direction operation and an H-bridge configuration for bidirectional control. PWM (Pulse Width Modulation) control can be used to regulate motor torque.

Allegro is a leading supplier of automotive electronic integrated circuits and is fully supportive of ISO 26262: Road Vehicles – Functional Safety. Auto makers worldwide require that electronic safety systems and their components are developed in compliance with this state-of-the-art standard.

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| A3959 - DMOS Full-Bridge PWM Motor Driver | - 9.5 V to 50 V - 3 A  
- PH/EN Interface  
- Internal PWM, Sleep mode | [Image](#) |
| A5995 - DMOS Dual Full-Bridge PWM Motor Driver | - 8 V to 40 V – 3.2 A  
- SPI Interface or PH/EN  
- Internal PWM, Single Supply, OCP, Sleep mode, Fault Output | [Image](#) |
| A5957 - Full-Bridge PWM Gate Driver | - 4.5 V to 50 V – 1 kW Output  
- Direct Control  
- Fault, Reset | [Image](#) |

### Features

- Low standby current for energy efficiency
- Internal DMOS outputs or gate controllers to drive external MOSFETs
- Parallel interfaces with forward, reverse, coast, and brake modes
- Commercial grade and fully automotive qualified drivers
- Small footprint and reduced external components
- Strong protection and diagnostic features
- Integrated Current Sense
- Wettable Flank for Auto QFN
- ASIL compliant designs and processes to meet ISO 26262 requirements
- Three phase brush DC gate driver ICs with advanced diagnostics and verification features to support ASIL D safety goal compliance

### Applications

- EPS
- Braking
- Pumps
- Integrated Starter Generator (ISG)
- EGR (Exhaust Gas Recirculation)
- HUD
- Active Shutter Vents
- Gate lift, sunroof
- Robotic vacuums
- Low voltage and Gaming electronics
- Vending and ticketing machines
- 3D printing
- POS Printers
- Solar shutters/blinds
Allegro MicroSystems offers a full line of stepper motor driver and pre-driver ICs. These devices feature easy to use two wire step and direction translator interfaces as well as industry standard parallel or serial control. Microstepping positioning is available with resolutions from full step to 32 microsteps per step. Microstepping results in increased step accuracy, and less resonance issues which results in lower audible noise. Safety features include thermal shutdown, undervoltage lockout and over current protection. Allegro offers a complete lineup of stepper motor drivers for automotive, industrial, consumer, and computer applications.

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<td><strong>AMT49700</strong> - Automotive Stepper Driver IC with Programmable Motion Control</td>
<td>Peak motor current up to 1.6 A at 28 V</td>
<td><img src="image1.png" alt="Image" /></td>
</tr>
<tr>
<td><strong>A5984</strong> - DMOS Microstepping Driver with Translator and Overcurrent Protection</td>
<td>Low current Sleep mode, &lt; 10 μA</td>
<td><img src="image2.png" alt="Image" /></td>
</tr>
<tr>
<td><strong>A5988</strong> - Quad DMOS Full-Bridge PWM Motor Driver</td>
<td>Peak motor current up to 1.6 A and 40 V</td>
<td><img src="image3.png" alt="Image" /></td>
</tr>
<tr>
<td><strong>A3916</strong> - Dual DMOS Full-Bridge Motor Driver</td>
<td>2.7 V operation, single supply</td>
<td><img src="image4.png" alt="Image" /></td>
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### Features
- APFD Adaptive Percent Fast Decay
- Microstepping up to 32 microsteps per full step
- Diagnostic outputs for short circuit protection and stall detect assistance
- Protection features – Under-voltage lockout, thermal shutdown, shoot through, overvoltage, over current protection
- Internal DMOS outputs or gate controllers to drive external MOSFETs
- Fixed off-time PWM current control
- Accurate positioning and speed control without high cost external encoder feedback
- Slow, fast and mixed current decay options
- Synchronous rectification

### Applications
- HVAC
- Heads Up Display
- Throttle Control
- Head Lamp leveling
- CCTV camera scan, tilt, focus control
- 3-D Printers
- Imaging systems – microscopes, industrial imaging
- Laser/dot matrix/inkjet/POS/Label
- Manufacturing industries – textile, robotic placement
ALLEGRO MICROSYSTEMS – A WORLDWIDE LEADER IN POWER AND SENSING SEMICONDUCTOR TECHNOLOGY

Inspired to innovate, Allegro is redefining the future of power and sensing semiconductor technologies. Our global engineering, manufacturing, and support, combined with our agility, make us a trusted partner to both large enterprises and regional market leaders.

From green energy to advanced mobility and motion control systems, Allegro’s global team is passionate about developing intelligent solutions that give our customers a competitive edge and move technology – and the world – toward a safer and sustainable future.

ALLEGRO AT A GLANCE

30 YEARS OF SEMICONDUCTOR INNOVATION

OVER 400 ACTIVE US PATENTS

OVER 10,000 CUSTOMERS WORLDWIDE

IN MARKET SHARE* FOR MAGNETIC SENSOR ICS

OVER 1 BILLION ICS SHIPPED ANNUALLY

A TOP SUPPLIER** OF AUTOMOTIVE SENSOR ICS

* Source: IHS Markit, Technology Group, Magnetic Sensors Report • 2018. Information is not an endorsement of Allegro MicroSystems. Any reliance on these results is at the third party’s own risk. Visit www.technology.ihs.com for more details.

** Source: Strategy Analytics Automotive Semiconductor Vendor Shares 2018

Headquartered in Manchester, NH (USA), Allegro has design, applications, and sales support centers located across the Americas, Europe, Japan, and Asia. At Allegro, our investment in innovation helps our customers become more successful through the co-creation of technologies that differentiate their products.

To see how Allegro can bring your technology into the future, visit allegromicro.com.
SEE HOW ALLEGRO IS MOVING THE WORLD TOWARD A SAFE AND SUSTAINABLE FUTURE

Learn more about Allegro Motor Control at www.allegromicro.com