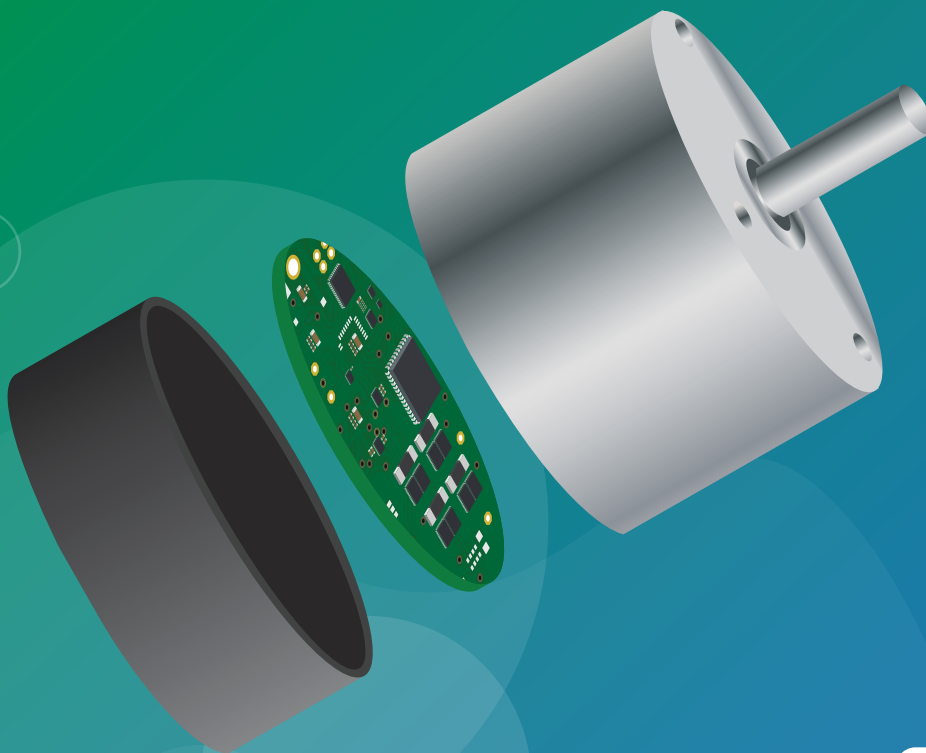


MOTOR DRIVERS

Power Management Solutions



MPS
MonolithicPower.com

Quality Assurance & Reliability Commitment

The MPS Quality Assurance organization develops, coordinates, and champions strategic quality initiatives throughout MPS Inc., its foundries, and sub-contractors. Its mission is to enable MPS to design, develop, manufacture, and deliver products to our customers with world-class quality and reliability that meet and exceed our customers' expectations.

MPS and Its Supplier Quality Systems and Certificates:

- ISO9001:2008 (MPS)
- EU RoHS/HF/REACH Compliant (MPS)
- Sony Green Partner (MPS & Suppliers)
- TS16949 (Suppliers)
- ISO14001 (Suppliers)

Product Quality:

- Automotive Products Qualified per AEC-Q100 Standard
- Standard Products Qualified per JEDEC and Military Standard
- Reliability Failure Rate <10FIT
- Product Quality Level <1.0ppm

Quality Control and Monitor:

- On-Site Foundry and Assembly Teams for Real-Time Actions
- Quarterly Supplier Quality Review and Annual Supplier Audit
- Short-Term Reliability Monitor Test – Daily
- Long-Term Reliability Monitor Test – Monthly
- Real-Time Engineering Actions on Monitor Failure
- Quarterly Reliability Monitor Reports



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Complete EV Motor Driver Solutions

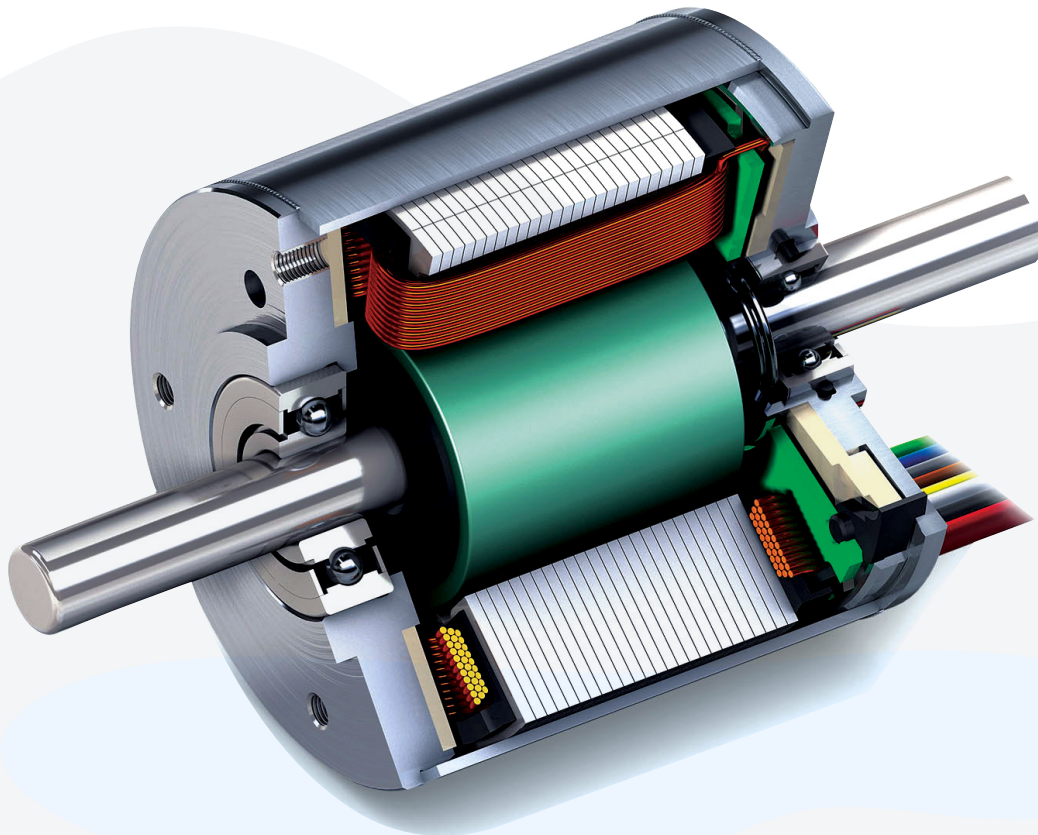
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Driving the Market in Reliability & Efficiency

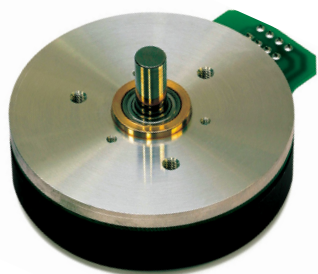
MPS motor driver solutions offer a wide range of high-performance, cost-effective, and reliable solutions for stepper motors, brushless DC motors, brushed DC motors, and solenoids. Using industry-leading semiconductor processes and advanced packaging technologies, MPS motor drivers achieve the highest efficiency, best thermal performance, and smallest solution size.



Superior Motor Driver Solutions

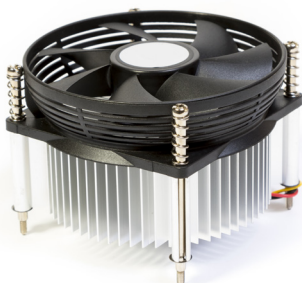
Thermal Performance

Proprietary DMOS
technology



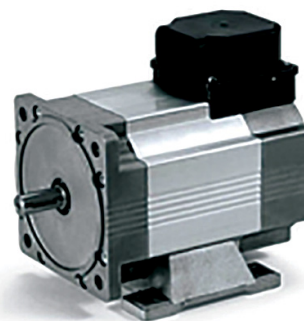
Integrated Designs

Proprietary packaging
technology

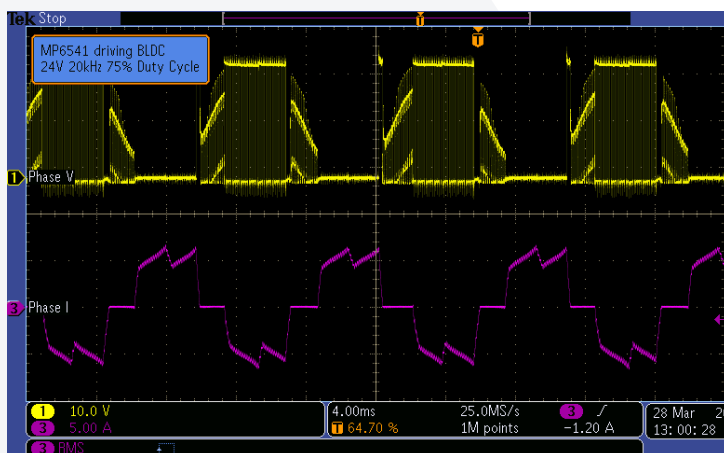
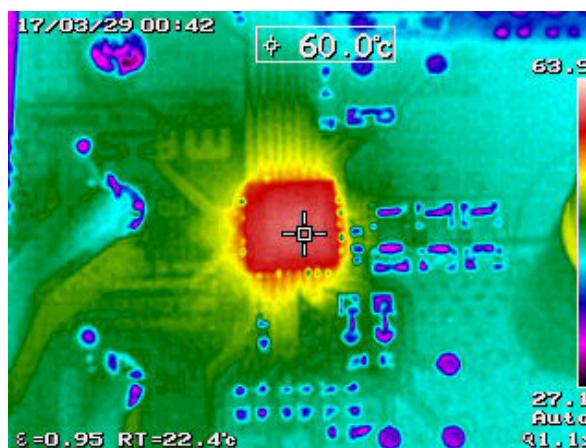


High-Precision Control

Revolutionary speed
& position sensing



MPS' proprietary Fourth Generation BCD™ process technology is the key to its competitive advantage. Many conventional analog technologies are handicapped by an inability to support the integration of power devices at high power levels. This results in unacceptably large semiconductors and/or significant levels of power loss.

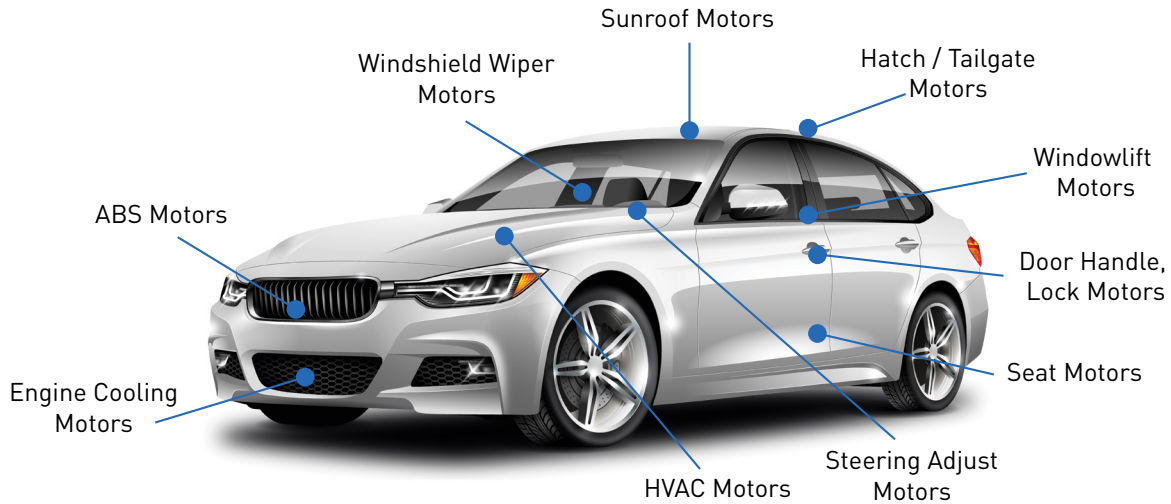


High power loss results in significant heat dissipation. This must be managed to avoid damaging or reducing the overall performance and efficiency of the system. Thus, MPS has created superior motor driver solutions for multiple applications.

Typical Applications

AUTOMOTIVE

MPS offers motor drivers specifically tailored to automotive applications. From tiny DC brush motors that direct airflow inside a climate control unit, to body control like power liftgates and latches, to high-power brushless motors like those in an e-turbo, MPS has a driver solution.



ROBOTICS

MPS offers the smallest, most highly integrated drivers for brushless and stepper motors used in robotics. Our three-phase power stages can deliver up to 10 amps of current and pack an entire drive stage into a tiny, single-chip solution, enabling electronics to be integrated right at the motor. Our stepper motor drivers offer better current control and require less PCB area than other drivers on the market.



PRINTERS

From tiny, low-power point-of-sale (POS) printers all the way up to large office printers and copiers, MPS has motor drivers for all types of printers. The portfolio includes small DC brush motor drivers, stepper motor drivers for small and large motors alike, and pre-drivers for large brushless motors, such as those used in copiers.



POWER TOOLS

All kinds of power tools are moving away from gasoline engines to rechargeable electric power. From small power screwdrivers to electric lawn mowers, MPS brushless motor drivers and pre-drivers power all kinds of tools. The MPS portfolio showcases a wide range of drivers up to 100 volts.



Stepper Motor Drivers

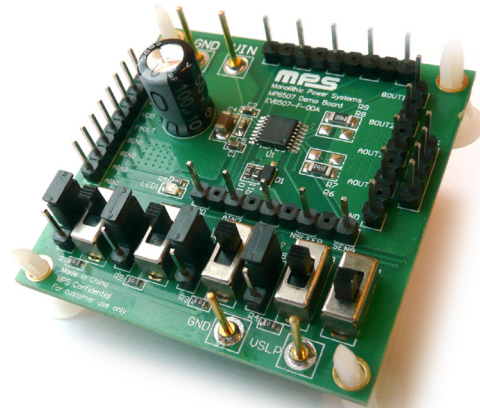
A stepper motor allows for precise position control without the need for a feedback system. It is widely used in open-loop position control systems. MPS stepper motor drivers are optimized to drive bipolar stepper motors used in printers, document scanners, office/factory automation, security system, scientific, and medical equipment.

Features

- Two Internal Full-Bridge Drivers
- Stepper Indexer or Parallel Control
- Low On Resistance
- No Control Supply Required
- Sink and Source Over-Current Protection
- Thermal Shutdown and UVLO Protection
- Thermally Enhanced Packages
- High Breakdown Voltage

MPS Advantages

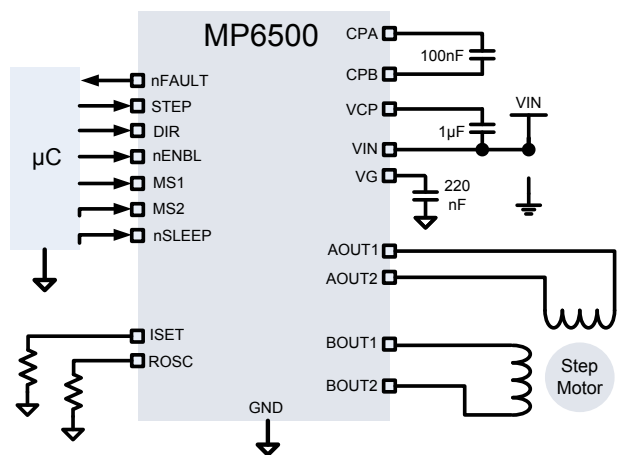
- Low On Resistance Significantly Improves Thermal Performance
- Smooth Torque and Accurate Stepping Control
- Extensive Protection Functions Increase System Reliability



Part Number	Min Input (V)	Max Input (V)	Max Current (A)	Step Mode	Control Interface	Description	Status
MP6506	2.7	15	0.5	Full, Half	Parallel	15V, 0.5A Bipolar Stepper Motor Driver	Released
MP6507	2.7	15	0.7	Full, Half	Parallel	15V, 0.7A Bipolar Stepper Motor Driver	Released
MP6508	2.7	18	1.2	Full, Half	Parallel	18V, 1.2A Bipolar Stepper Motor Driver	Released
MP6509	2.7	18	1.2	Full, Half	Parallel	18V, 1.2A Bipolar Stepper Motor Driver with Current Attenuation	Released
MP6520	8.5	35	1.2	Full, Half, Quarter, Eighth	Indexer	35V, 1.3A Bipolar Stepper Motor Driver with Micro-Stepping	Released
MP6518	8.5	35	1.5	Full, Half, Quarter, Eighth	Indexer	35V, 1.5A Bipolar Stepper Motor Driver with Micro-Stepping	Released
MP6600	4.5	35	1.5	Full, Half, Quarter, Eighth	Indexer	35V, 1.5A Bipolar Stepper Motor Driver with Micro-Stepping	Released
MP6501A	8.5	35	2.5	Full, Half, Quarter, Eighth	Indexer	35V, 2.5A Bipolar Stepper Motor Driver with Micro-Stepping	Released
MP6500	8.5	35	2.8	Full, Half, Quarter, Eighth	Indexer	35V, 2.8A Bipolar Stepper Motor Driver with Micro-Stepping and Internal Current Sense	Released

MP6500 NEW

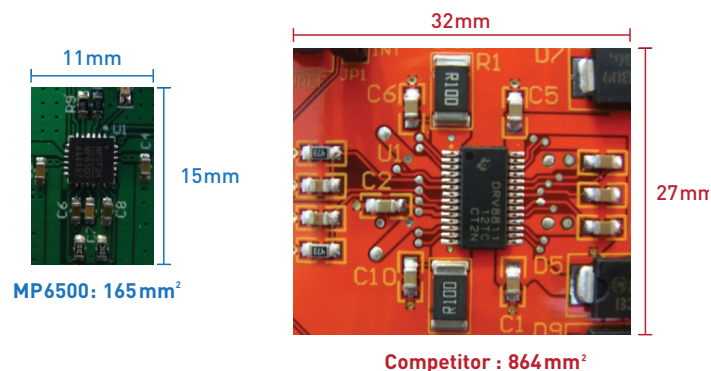
2.5A Bipolar Stepper Motor Driver with Internal Current Sense



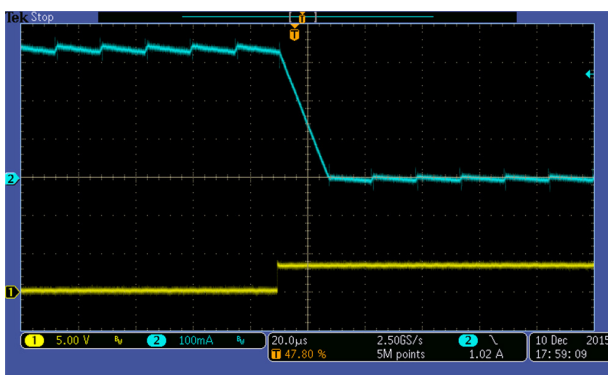
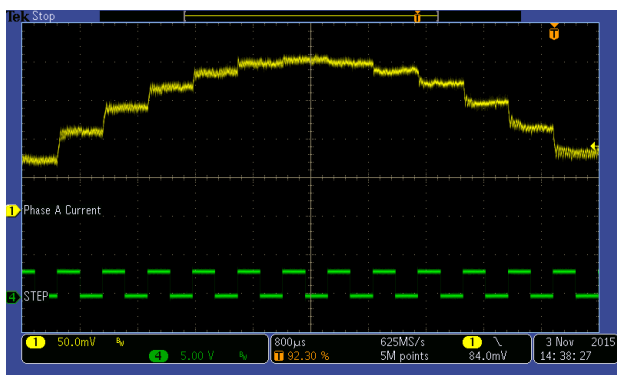
Features

- Wide 4.5V to 35V Input Voltage Range
- Two Internal Full-Bridge Drivers
- Low On Resistance (HS: 170mΩ; LS: 150mΩ)
- No Control Power Supply Required
- Simple Logic Interface
- 3.3V and 5V Compatible Logic Supply
- Step Modes from Full-Step to 1/8-Step
- Automatic Current Decay
- Over-Current Protection (OCP)
- Input Over-Voltage Protection (OVP) Function
- Thermal Shutdown and Under-Voltage Lockout (UVLO) Protection
- Fault Indication Output
- Space-Saving QFN-24 (5mmx5mm) and Thermally Enhanced 24-Pin TSSOP Packages

Small Solution Size with Integrated Current Sensing



Better Current Control for Improved Motion Quality



Brushed DC / Solenoid Drivers

A brushed DC motor is a mechanically commutated motor running from a DC power source. It is widely used in many consumer and industrial applications due to its simplicity and cost-effectiveness. MPS H-bridge drivers are designed to drive brushed DC motors and solenoids in consumer appliances, toys, automotive, and industrial applications.

Features

- Integrated Half-/Full-Bridge Drivers
- Low On Resistance
- Internal Charge Pump
- Low Quiescent/Sleep Current
- Over-Current and Over-Temperature Protections
- Thermally Enhanced Packages

MPS Advantages

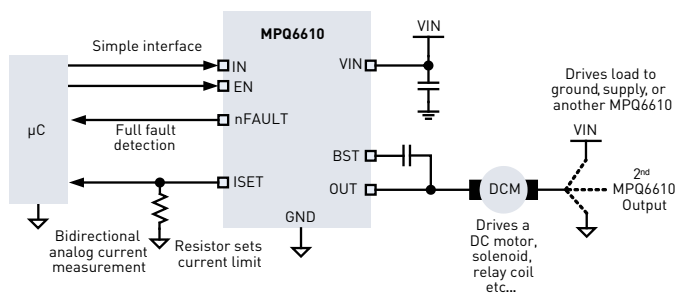
- Low On Resistance Significantly Improves Thermal Performance
- Extensive Protection Functions Increase System Reliability

Wide Input Range to Support Different Applications

Part Number	Min Input (V)	Max Input (V)	Number of Half-Bridges	Output Current (A)	Control Interface	Description	Status
MP6506	2.7	15	4	0.5	PWM	15V, 0.5A Dual Full-Bridge Driver	Released
MP6507	2.7	15	4	0.7	PWM	15V, 0.7A Dual Full-Bridge Driver	Released
MP6513	2	21	2	0.8	PWM	21V, 0.8A Full-Bridge Driver	Released
MP6514	2	21	2	0.8	Hi/Lo	21, 0.8A Full-Bridge Driver	Released
MPQ6523	7	40	3	0.9	SPI	40V, 0.9A Triple Half-Bridge Driver	Released
MPQ6526	7	40	6	0.9	SPI	40V, 0.9A Hex Half-Bridge Driver	Released
MP6508	2.7	18	4	1.2	PWM	18V, 1.2A Dual Full-Bridge Driver	Released
MP6509	2.7	18	4	1.2	PWM	18V, 1.2A Dual Full-Bridge Driver with Current Attenuation	Released
MP6515	8	35	2	2.8	PWM	35V, 2.8A Full-Bridge Driver with Internal Current Sense	Released
MP6516	8	35	2	2.8	Hi/Lo	35V, 2.8A Full-Bridge Driver with Internal Current Sense	Released
MPQ6610	5	60	1	3	Hi/Lo	60V, 3A Half-Bridge Driver	Released
MP6519	2.5	28	2	5	PWM	28V, 5A Full-Bridge Driver with Internal Current Sense	Released
MP8049S	5	26	4	5.5	PWM	26V, 5.5A Dual Full-Bridge Driver	Released

MPQ6610 **NEW**

60V, Versatile 3A Driver – High-Side, Low-Side, or Half-Bridge, with Current Measurement and Full Protection Features

**Features**

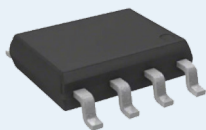
- Wide 5V to 60V Input Voltage Range
- 3A Maximum Output Current
- Internal Half-Bridge Driver
- Cycle-by-Cycle Current Regulation / Limit
- Low On Resistance (HS: 100 mΩ; LS: 100 mΩ)
- No Control Power Supply Required
- Simple, Versatile Logic Interfaces
- Inputs Compatible With 2.5V, 3.3V, and 5V logic
- Over-Current Protection (OCP)
- Open Load Detection
- Thermal Shutdown
- Under-Voltage Lockout (UVLO)
- Fault Indication Output
- Thermally Enhanced Package

Low RDS(ON) Enables Smallest Footprint

MPQ6610

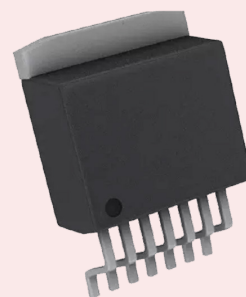


9mm² (TSOT23)



30mm² (SOIC) 100mΩ

Competition



150mm² 160mΩ

Brushless DC Pre-Drivers

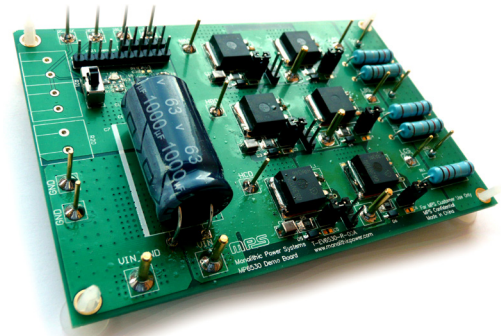
A brushless DC motor is an electronically commutated motor running from a DC source. Due to its high reliability and ruggedness, it has been used in many speed control systems. MPS brushless DC motor pre-drivers are designed to drive high-power brushless DC motors used in various industrial, automotive, and consumer applications, such as power tools, fans, pumps, E-bikes, etc.

Features

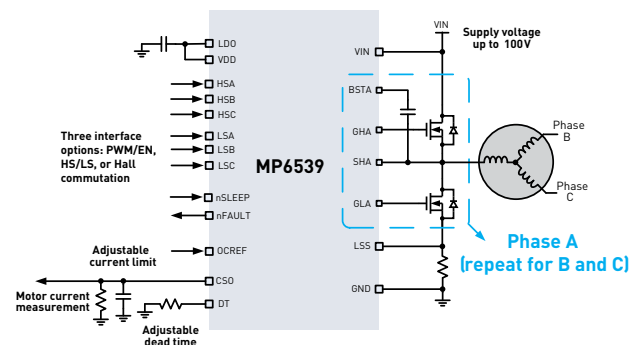
- Single or Triple H-Bridge MOSFET Pre-Drivers
- Wide Input Voltage Range
- Internal Charge Pumps
- Over-Current Protection (OCP)
- Adjustable Dead Time to Prevent Shoot-Through
- Thermal Shutdown and UVLO Protection

MPS Advantages

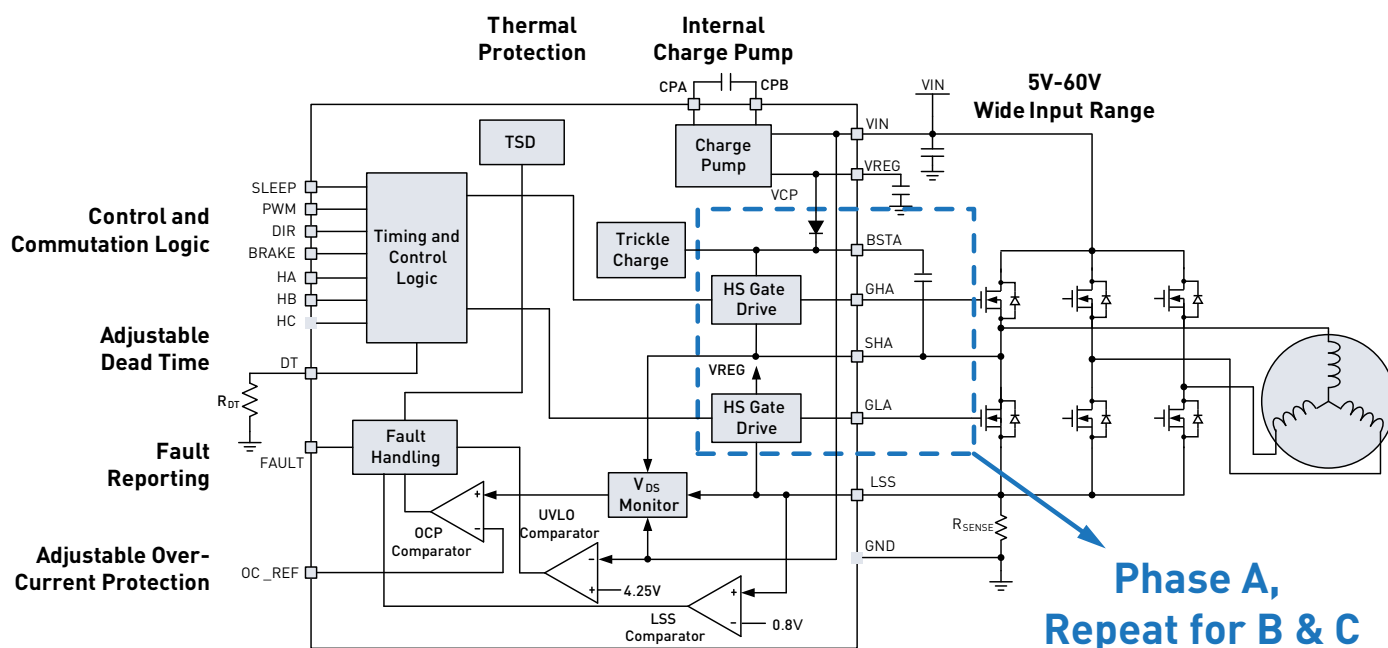
- Low On Resistance Significantly Improves Thermal Performance
- Wide Input Range to Support Different Applications
- Extensive Protection Functions Increase System Reliability



Part Number	Min Supply (V)	Max Supply (V)	Max SW Voltage (V)	Number of Half-Bridges	Sink/Source Current (A)	Hall Input	Description	Status
MP6531A	5	60	60	1	1	No	60V 3-Phase BLDC Motor Pre-Driver	Released
MP1921A	9	18	100	1	2.5/1.5	No	100V 2.5A Half-Bridge Gate Driver	Released
MP6534	5	60	60	3	1/0.8	No	60V 3-Phase BLDC Motor Pre-Driver with 500mA Buck Regulator	Released
MP6535	5	60	60	3	1/0.8	Yes	60V 3-Phase BLDC Motor Pre-Driver with Hall Input and 500mA Buck Regulator	Released
MP6530	5	60	60	3	1/0.8	No	60V 3-Phase BLDC Motor Pre-Driver	Released
MP6539	8	100	100	3	0.8/1	No	100V 3-Phase BLDC Motor Pre-Driver	Released
MP6537	8	100	100	3	1/0.8	No	100V 3-Phase BLDC Motor Pre-Driver	Released
MP6538	8	100	100	3	1/0.8	No	100V 3-Phase BLDC Motor Pre-Driver with Hall Input	Released
MP6532	5	60	60	3	1/0.8	Yes	60V 3-Phase BLDC Motor Pre-Driver with Hall Input	Released

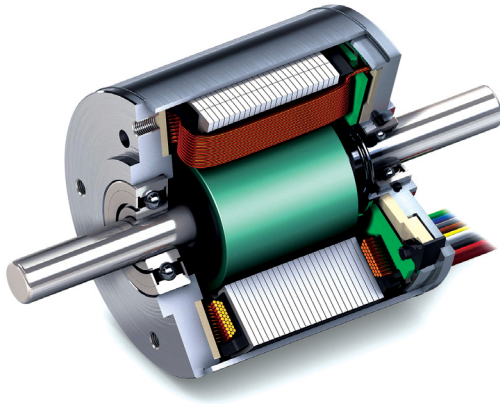
MP6539 **NEW****100V, Three-Phase, BLDC Motor Pre-Driver with HS & LS Inputs****Features**

- Supports 100V Operation
- 120V VBST Maximum Voltage
- Internal LDO Supports External NPN for High-Current Drive Requirements
- Integrated Current-Sense Amplifier
- Low-Power Sleep Mode for Battery-Powered Applications
- Programmable Over-Current Protection (OCP) for External MOSFETs
- Adjustable Dead-Time Control to Prevent Shoot-Through
- Thermal Shutdown and Under-Voltage Lockout (UVLO) Protection
- Fault Indication Output
- Available in Thermally Enhanced Surface-Mounted TSSOP and QFN Packages

Has Current Measurement and Built-In Protection Features

Integrated BLDC Motor Drivers

The unique requirements for brushless fans require dedicated driver designs. MPS has solutions for single-phase and three-phase brushless fans used for cooling servers, laptops, and other electronic equipment. Integrated Hall sensors simplify the design and minimize the component count for small, low cost fans.



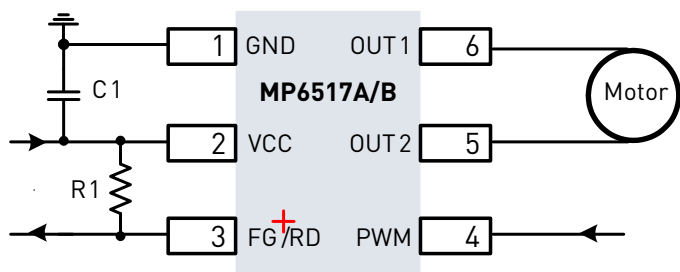
MPS Advantages

- Low On Resistance Significantly Improves Thermal Performance
- Wide Input Range to Support Different Applications
- Extensive Protection Functions Increase System Reliability
- No Need for External Clamping Devices
- Integrated Hall Sensor

Part Number	Min Input (V)	Max Input (V)	Number of Half-Bridges	Output Current (A)	Hall Input	Description	Status
MP6505	4.5	16	2	0.4	Yes	16V, 0.4A Single-Phase BLDC Motor Driver, Speed Indicator, Locked Rotor Protection	Released
MP6510	4.5	16	2	0.6	Yes	16V, 0.6A Single-Phase BLDC Motor Driver, Speed Indicator, Locked Rotor Protection	Released
MP6517A/B	3	18	2	0.6	No	18V, 0.6A Single-Phase BLDC Motor Driver, Hall Sensor, Programmable Speed Curve, Locked Rotor Protection, Speed Indicator	Released
MP9518	3	18	2	0.6	No	18V, 0.6A Single-Phase BLDC Motor Driver with Hall Sensor, Speed Indicator, Locked Rotor Protection	Released
MP6536	5	26	3	5.5	No	26V, 5A 3-Phase Power Stage	Released

MP6517A/B NEW

Single-Phase, BLDC, Motor Driver with Integrated Hall Sensor in a TSOT23-6 Package



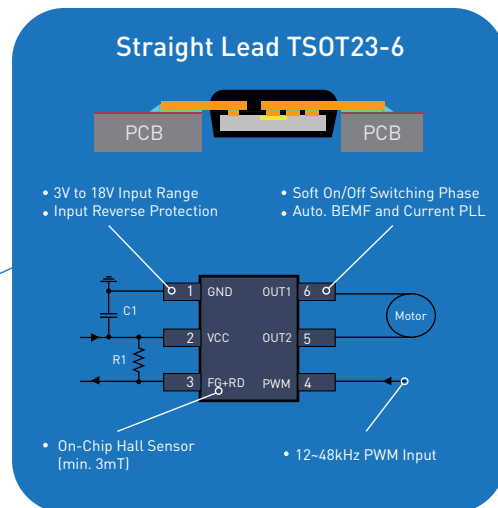
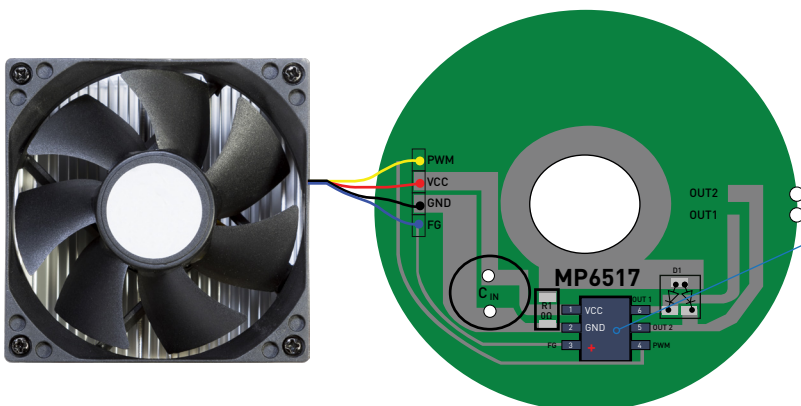
Features

- Embedded Hall Sensor with High Sensitivity
- Wide 3.3V to 16V Operating Input Range
- Up to 2A Programmable Current Limit
- Integrated Power MOSFETs: Total 850mΩ (HS + LS)
- Programmable Speed Curve
- Built-In Adjustable Speed Curve Corner Setting
- Automatic Phase Lock Detection of Winding BEMF and Current Zero-Crossing
- Soft On/Off Phase Transition
- Rotational Speed Indicator (FG) Signal
- 12kHz to 48kHz PWM Input Frequency Range
- Fixed 26kHz Output Switching Frequency
- Input Line Reverse-Voltage Protection (RVP)
- Rotor Deadlock (RD) Protection and Automatic Recovery
- Thermal Protection and Automatic Recovery
- Built-In Input OVP, UVLO, and Automatic Recovery
- MP6517A Supports Standby Mode
- Available in TSOT23-6-L, TSOT23-6-R, TSOT23-6-SL, and TSOT23-6-RSL Packages

Industry's First BLDC Fan Driver with Integrated Hall Sensor in a Tiny TSOT23 Package

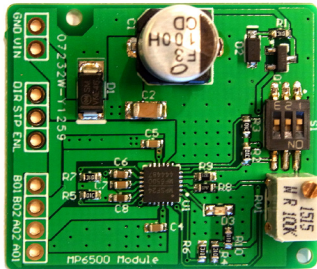
Simple PCB Design with Only 2 Components Needed

Compared to 7 or 8



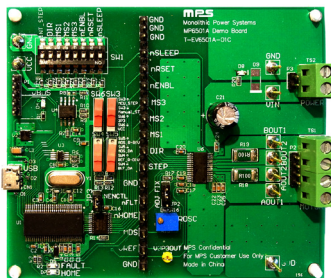
Complete EV Motor Driver Solutions

Stepper Motor



MP6500 Solution Kit (EVKT6500) \$99

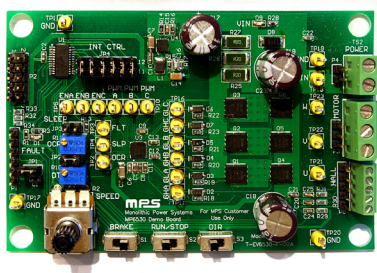
- Simple solution kit for the MP6500 stepper motor driver with internal current sense
- Connect to power, a bipolar stepper motor, and a pulse generator
- Small size: 30x35mm



MP6501A Solution Kit (EVKT6501A) \$119

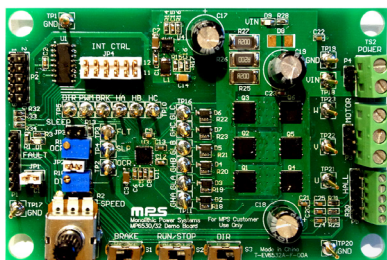
- Solution kit for the MP6501A stepper motor driver
- Built-in microcontroller and USB interface connects with the included easy-to-use Windows GUI
- Can also be controlled externally

Brushless DC



MP6530 Solution Kit (EVKT6530) \$119

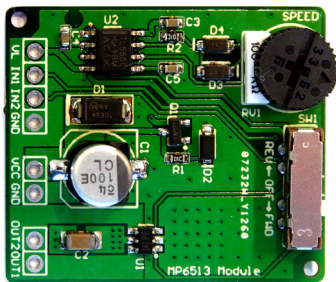
- Solution kit for the MP6530 3-phase pre-driver to drive a brushless DC motor
- Microcontroller with open-loop speed control and Hall commutation built-in
- 3mΩ FETs on-board can drive up to 60V, 15A motors



MP6532 Solution Kit (EVKT6532) \$119

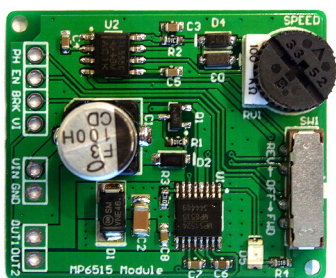
- Solution kit for the MP6532 3-phase pre-driver with Hall sensor inputs
- Microcontroller with open-loop PWM speed control built-in
- 3mΩ FETs on-board can drive up to 60V, 15A motors

Brushed DC Motor & Solenoid



MP6513 Solution Kit (EVKT6513) \$79

- Simple solution kit for the MP6513 H-bridge motor driver
- Open-loop PWM speed control built-in
- Small size: 30x35mm



MP6515 Solution Kit (EVKT6515) \$79

- Simple solution kit for the MP6515 H-bridge motor driver
- Open-loop PWM speed control built-in
- Small size: 30x35mm

*Images not to scale

ABOUT MONOLITHIC POWER SYSTEMS

Who we are:

We are creative thinkers. We break boundaries. We take technology to new levels. As a leading international semiconductor company, Monolithic Power Systems (MPS) creates cutting-edge solutions to improve the quality of life with green, easy-to-use products.

What we do:

We make power design fun! With our innovative proprietary technology processes, we thrive on re-imagining and re-defining the possibilities of high-performance power solutions in industrial applications, telecom infrastructures, cloud computing, automotive, and consumer applications.

Where we come from:

It started with a vision. Michael Hsing, pioneering engineer and CEO, founded Monolithic Power Systems, Inc. in 1997 with the belief that an entire power system could be integrated onto a single chip. Under his leadership, MPS has succeeded not only in developing a monolithic power module that truly integrates an entire power system in a single package, but also it continues to defy industry expectations with its patented groundbreaking technologies.

Our values:

We cultivate creativity

As a company we believe in creating an environment that encourages and challenges our employees to collaborate and think outside the box to excel beyond their preconceived capabilities.

We do not accept the status quo

We do not believe in limitations. It is not about what is, but what can be. Possibilities are endless at MPS.

We are passionate about sustainability

It's about the future. From materials to finances, we are committed to conservation. We will not tolerate waste in an effort to improve and preserve the quality of life.

We are committed to providing innovative products to our customers.

Let us do the heavy lifting. We relentlessly strive to make system design versatile and effortless to meet our customers' specific needs. We'll do the work, so our customers can have the fun!

CONTACT & ORDERING

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MPS China-Chengdu

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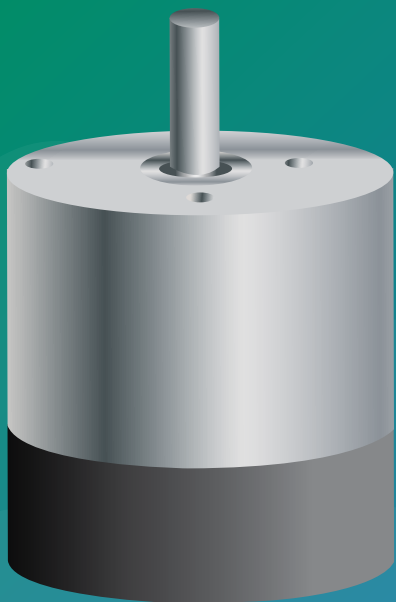
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