Motor Driver Solutions

Quality Assurance & Reliability Commitment

The MPS Quality Assurance organization develops, coordinates, and champions strategic quality initiatives throughout MPS Inc., its foundries, and subcontractors. 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:

- ISO 9001:2008 (MPS)
- EU RoHS/HF/REACH Compliant (MPS)
- Sony Green Partner (MPS & Suppliers)
- TS16949 (Suppliers)
- ISO 14001 (Suppliers)

Product Quality:

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

Quality Control and Monitoring:

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

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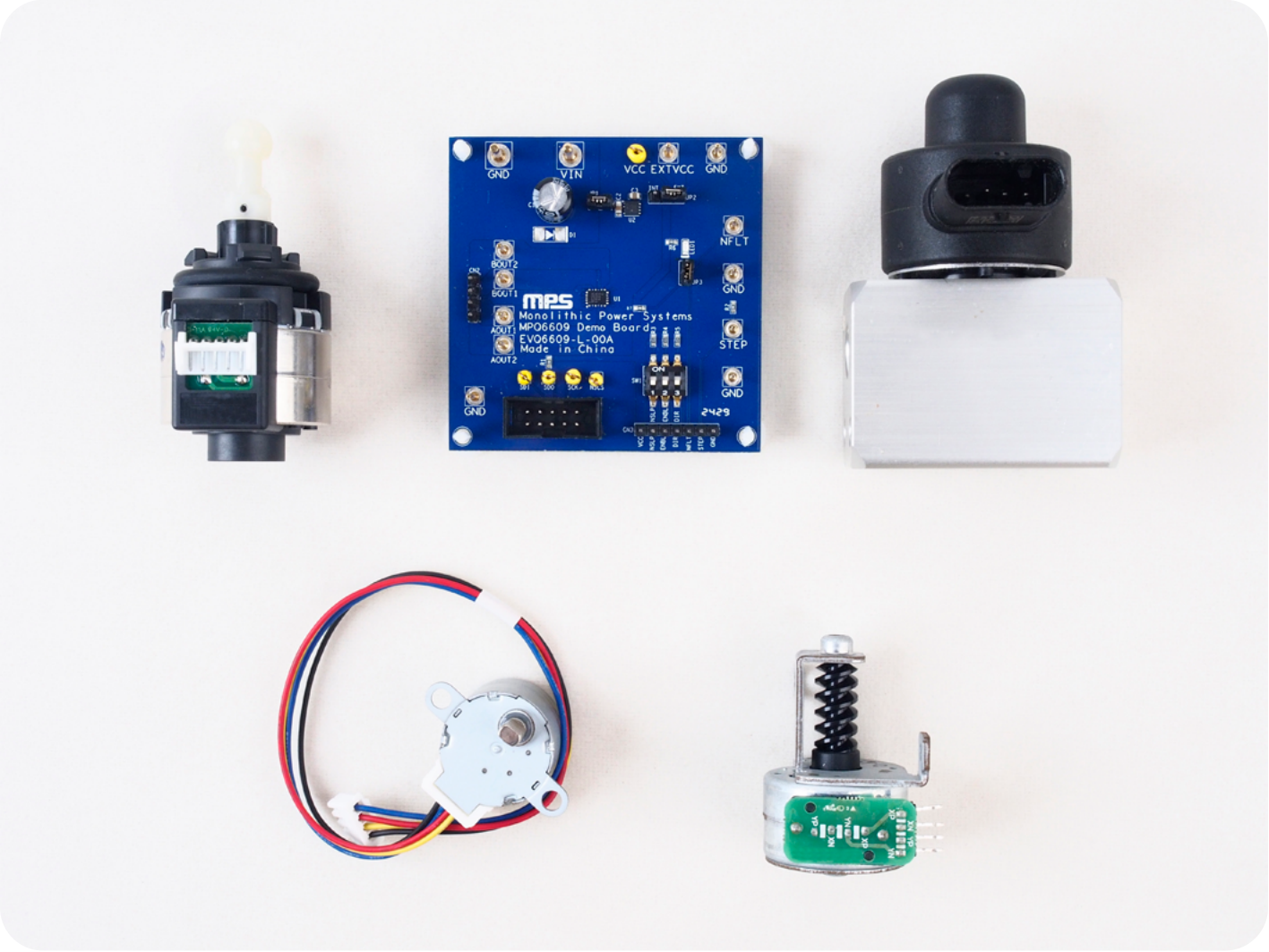
Driving the Market in Reliability & Efficiency

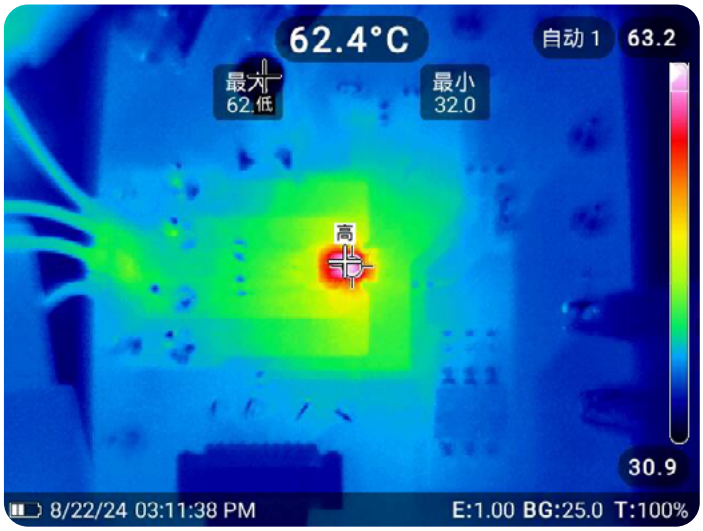
MPS motor driver solutions offer a wide range of high-performance, cost-effective, and reliable solutions for stepper motors, brushless DC (BLDC) motors, brushed DC motors, and solenoids. Using industry-leading semiconductor processes and advanced packaging technologies, MPS motor drivers achieve the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



Superior Motor Driver Solutions

Thermal Performance

Low Power Loss



Conditions:

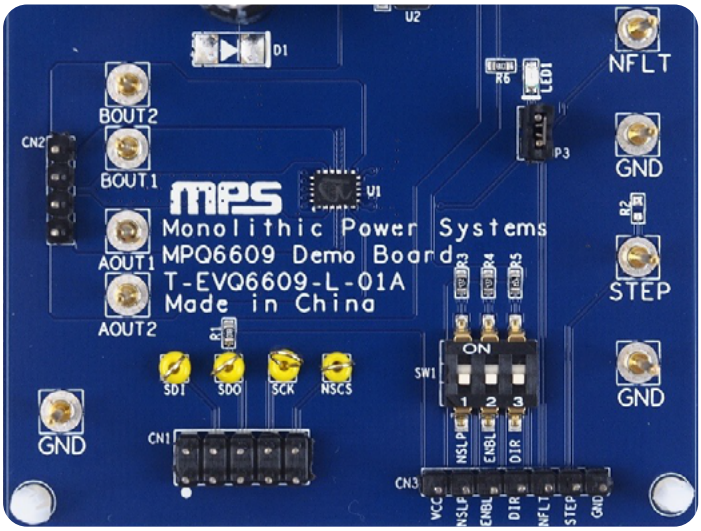
V_{IN} = 12V, I_{PEAK} = 1A, f_{STEP} = 1kHz, 1/16 Step Mode

MPS's proprietary Sixth-Generation BCD™ process technology is the key to its competitive advantage. Many conventional analog technologies are hindered 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, which must be managed to avoid damaging or reducing the overall performance and efficiency of the system. To address this, MPS has created superior motor driver solutions for multiple applications.

Integration & Packaging

Small Package Sizes



EVQ6609-L-00A:

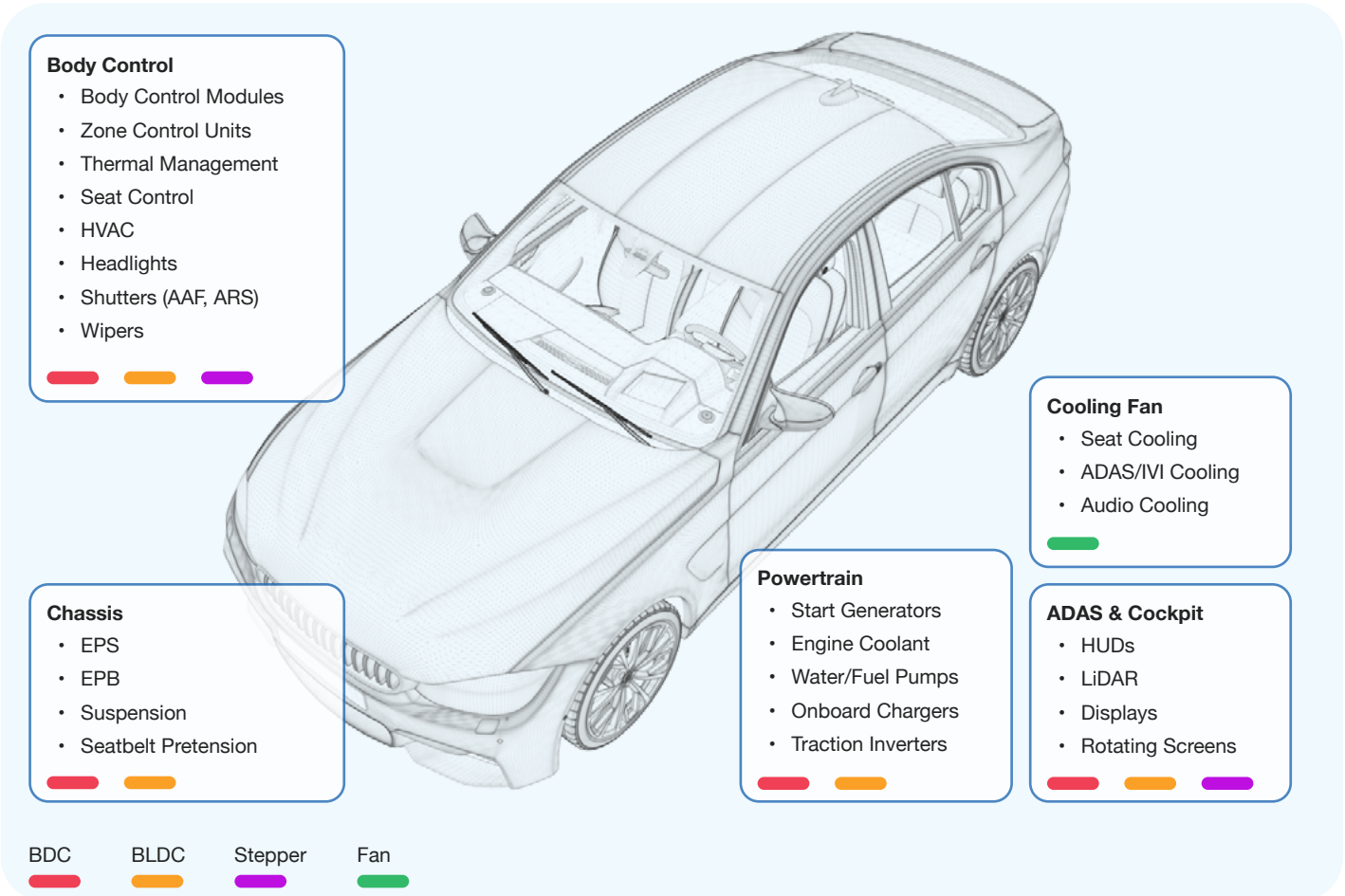
6.5cmx6.5cm

Multiple package options, including tiny flip-chip QFN packages, enable the implementation of motor driver systems in the smallest possible PCB area.

High integration, including the integration of features such as internal current-sensing and slew rate control, allows for a dramatic reduction in the system component count. This lowers cost and increases reliability.

Automotive

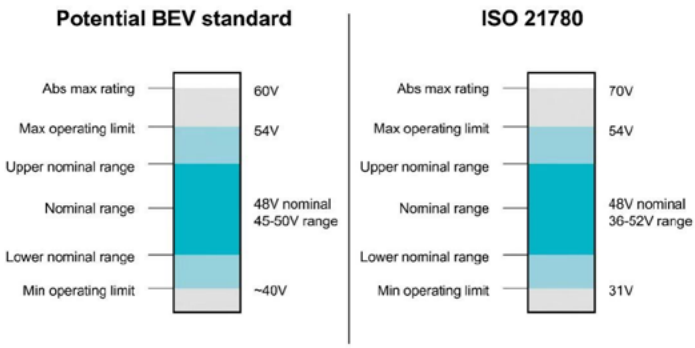
MPS offers motor drivers specifically tailored to automotive applications. From tiny brushed DC motors that direct airflow inside a climate control unit to body control for power liftgates, latches domain control, compact brushless DC (BLDC) motor drivers used in LiDAR water/fuel pumps, stepper motor drivers used for HUDs, adaptive headlights, single-/three-phase BLDC fan drivers used for seat ventilation, and cooling units, MPS has a motor driver solution for your automotive application.



48V Automotive Motor Drivers

	Brushed DC Motor Drivers	BLDC Motor Drivers	Stepper Motor Drivers	Fan Drivers
Pre-Drivers (Ext. MOSFET)	MPQ192x* MPQ6539	MPQ6539 MPQ664x*	-	-
Power Stages (Int. MOSFET)	MPQ6603	-	-	MPQ665x*

- MPS offers comprehensive solutions for different motor loads in 48V systems
- Fully integrated diagnostics and protection features
- Configurable as a high-side or low-side driver for solenoids or valves
- Integrated power stage can support power ratings up to:
  - 400W for brushed DC motor drivers
  - 160W for BLDC motor drivers
  - 40W for stepper motor drivers
  - 25W for 1-phase fan drivers
- ISO 21780 compliant



*Represents product family, where "x" stands for a numeral.

Humanoid Robotics

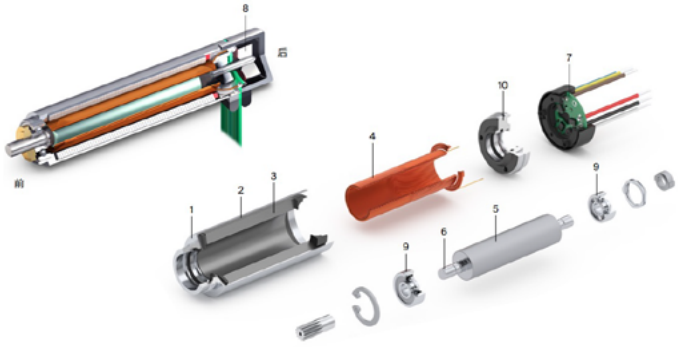
Dexterous hand robotics

Dexterous hand robotics often use a coreless motor, which features:

- Small Size (4mm to 30mm OD)
- No Cogging Torque
- Long Life
- High Efficiency
- Excellent Control Performance
- Low Electrical Time Constant
- Good Heat Dissipation Performance and Strong Overload Capacity
- Fast Response Time (Mechanical Time Constant Is Typically less than 5ms)

The latest innovative design is each hand is equipped with 20+ degrees of freedom (DOF), meaning 20+ coreless motors in one hand. MPS's total solutions offer advantages including:

- Greatly Simplified Hand Control Board Design
- Scalable and Flexible Design for Higher DOF
- Fits into ≥10mm Diameter Motors with Small Size



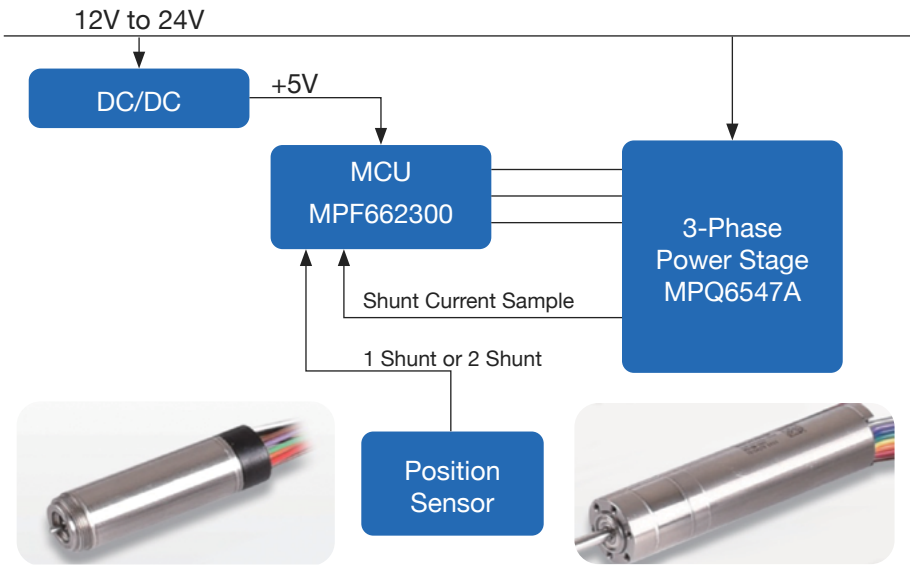
Coreless Motor

MPS Total Solution for Coreless Motors

MPF66200 + MP6547/8/9

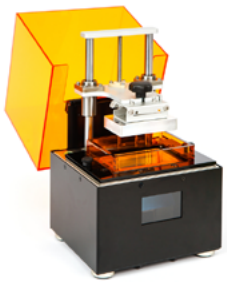
Cost-Effective Solution:

- Fixed Power Level for Up to 5A RMS
- Small Form Factor Reduces External Component Requirements
- Inrush Voltage Up to 36V
- Multiple Communication Interface Options:
  - UART
  - I²C
  - PWM
- Robust Control Algorithm for Field-Oriented Control (FOC)
  - Four-Quadrant Operation for Quick Acceleration and Deceleration
  - 0rpm to 60000rpm
  - 30krpm 2-Pole Pair Blower
  - 12V to 24V



Printers

From tiny, low-power handheld printers all the way up to large office printers and copiers, as well as increasingly popular 3D printers, MPS has motor drivers for all types of printers. The portfolio includes small brushed DC motor drivers, stepper motor drivers for small and large motors alike, and pre-drivers for large brushless motors, such as those used in copiers.



Drones & Stabilizers

Drones and gimbals are becoming increasingly popular, typically requiring brushless DC (BLDC) motors for propellers in drones and for stabilizers in cameras. For small-sized models, there are strict requirements for the size and heat dissipation of the drive scheme. MPS's BLDC motor drivers offer high integration, small package sizes, and excellent thermal performance, making them a perfect fit for this market.

Power Tools

Many power tools are moving away from gasoline engines to rechargeable electric power. MPS's BLDC motor drivers and pre-drivers power all kinds of tools, such as small power screwdrivers and electric lawn mowers. Our portfolio showcases a wide range of drivers up to 100V.

Industrial

Many types of small- and medium-sized industrial equipment — such as textile machinery, semiconductor testing machines, and laser engravers — require stepper and BLDC motors. MPS motors are well-suited for many of these applications.

Stepper Motor Drivers

MPS stepper motor drivers are optimized to drive bipolar stepper motors used in printers, document scanners, robots, and other office and factory automation equipment. The MPS stepper motor driver family includes both low-voltage and high-voltage devices, as well as parts with or without indexer or translator logic. Several MPS parts feature internal current regulation with no shunt resistors, and feature the most accurate current control in the industry, providing microstepping capability.

Features

- Two Internal Full-Bridge Drivers
- Stepper Indexer or Parallel Control
- Low On Resistance
- No Control Supply Required
- Sink and Source Over-Current Protection (OCP)
- Thermal Shutdown and Under-Voltage Lockout (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

Stepper Motor Drivers

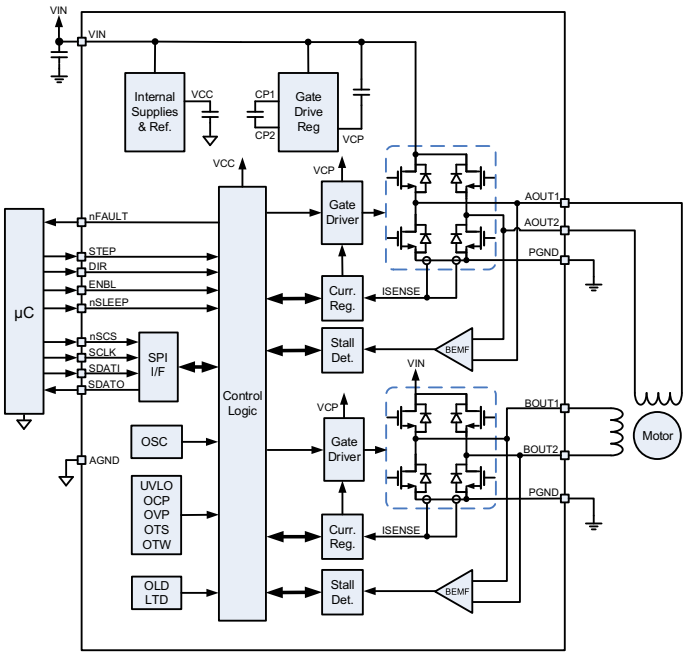
Part Number	V_{IN} (Min) (V)	V_{IN} (Max) (V)	I_{OUT} (Max) (A)	$R_{DS(ON)}$ (HS + LS) (mΩ)	Step Mode	Control Interface	Package	Notes
MP6506	2.7	15	0.5	500 + 500	1, 1/2	Parallel	QFN-16 (3x3)	Bipolar stepper
MP6507	2.7	15	0.7	500 + 500	1, 1/2	Parallel	TSSOP-16EP, QFN-16 (3x3), QFN-16 (4x4), TSSOP-16	Bipolar stepper
MP6508	2.7	18	1.2	250 + 250	1, 1/2	Parallel	TSSOP-16EP, QFN-16 (4x4)	Bipolar stepper
MP6508A	2.7	18	1.2	250 + 250	1, 1/2	Parallel	QFN-16 (3x3)	Bipolar stepper
MP6509	2.7	18	1.2	250 + 250	1, 1/2	Parallel	TSSOP-20EP	Bipolar stepper, current attenuation
MP6518	8	35	1.5	300 + 300	1, 1/2, 1/4, 1/8	Indexer	TSSOP-28EP	Bipolar stepper, microstepping
MP6520	8	32	1.5	300 + 300	1, 1/2, 1/4, 1/8	Indexer	QFN-28 (4x5)	Stepper, integrated MOSFETs
MP6600	4.5	35	1.5	195 + 170	1, 1/2, 1/4, 1/8	Indexer	QFN-24 (4x4)	Bipolar stepper, microstepping, internal current sense
MP6600L	4.5	35	1.5	195 + 170	1, 1/2, 1/4, 1/8	Indexer	QFN-24 (4x4)	Bipolar stepper, microstepping, internal current sense, latch-off function
MP6504	8	32	2	220 + 220	1, 1/2, 1/4, 1/8	Indexer	QFN-28 (4x5)	Bipolar stepper, microstepping
MP6501A	8	35	2.5	220 + 220	1, 1/2, 1/4, 1/8	Indexer	TSSOP-28EP	Bipolar stepper, microstepping
MP6601	4.5	35	2.5	170 + 150	1, 1/2, 1/4	Parallel	QFN-24 (5x5), TSSOP-28EP	Stepper, internal current sense

	Part Number	V_{IN} (Min) (V)	V_{IN} (Max) (V)	I_{OUT} (Max) (A)	$R_{DS(ON)}$ (HS + LS) (mΩ)	Step Mode	Control Interface	Package	Notes
	MP6500	4.5	35	2.5	195 + 170	1, 1/2, 1/4, 1/8	Indexer	QFN-24 (5x5), TSSOP-28	Bipolar stepper, microstepping, internal current sense
	MP6500A	4.5	35	2.5	195 + 170	1, 1/2, 1/4, 1/8	Indexer	TSSOP-28EP, QFN-24 (5x5)	Bipolar stepper, microstepping, internal current sense, programmable voltage
	MP6500L	4.5	35	2.5	195 + 170	1, 1/2, 1/4, 1/8	Indexer	QFN-24 (5x5)	Bipolar stepper, microstepping, internal current sense, latch-off function
	MP6602	4.5	35	4	60 + 30	1, 1/2, 1/4, 1/8, 1/16, 1/32	SPI, Indexer	QFN-25 (4x5)	Stepper, stall detection
	MP6603	8	55	5	65 + 50	1, 1/2, 1/4, 1/8	Parallel, Indexer	QFN-25 (4x5)	Dual full-bridge driver, selectable input interface
	MP6604A	4.5	45	2.5	150 + 150	-	IN/EN	QFN-28 (4x5), TSSOP-28EP	Simple dual H-bridge driver
	MP6604B	4.5	45	2.5	150 + 150	-	PHASE/EN	QFN-28 (4x5), TSSOP-28EP	Simple dual H-bridge driver
	MP6604C	4.5	45	2.5	150 + 150	-	HS/LS	QFN-28 (4x5), TSSOP-28EP	Simple dual H-bridge driver
	MP6605C	4.5	60	1.5	LS: 350	-	I²C	QFN-24 (4x4)	4-channel low-side driver
	MP6605D	4.5	60	1.5	LS: 350	-	Parallel	QFN-24 (4x4)	4-channel low-side driver
	MP6605E	4.5	60	1.5	LS: 350	-	SPI	QFN-24 (4x4)	4-channel low-side driver
	MP6606	4.5	60	0.75	LS: 700	-	SPI	TSSOP-20EP	8-channel low-side driver
N	**MPQ6605D-AEC1**	4.5	52	1.5	LS: 350	-	Parallel	QFN-24 (4x4)	4-channel low-side driver, AEC-Q100 qualified
S	**MPQ6606-AEC1**	4.5	52	0.75	LS: 700	-	SPI	TSSOP-20EP	8-channel low-side driver, AEC-Q100 qualified
N	**MPQ6609-AEC1**	4	32	1	350 + 230	1, 1/2, 1/4, 1/8, 1/16, 1/32	SPI	QFN-18 (3x4)	Bipolar stepper, internal current sense, rotor stall detection, BEMF measurement, AEC-Q100 qualified
	MPQ6600L-AEC1	4.5	35	1.5	195 + 170	1, 1/2, 1/4, 1/8	Indexer	QFN-24 (4x4)	Bipolar stepper, microstepping, internal current sense, latch-off function, AEC-Q100 qualified
S	**MPQ6603-AEC1**	8	55	5	65 + 50	1, 1/2, 1/4, 1/8	Parallel, Indexer	QFN-25 (4.5x5)	Dual full-bridge driver, selectable input interface, AEC-Q100 qualified

N New Product S Sampling Product P Preview Product

MPQ6609

Bipolar Stepper Motor Driver with Stall Detection & Back EMF Measurement

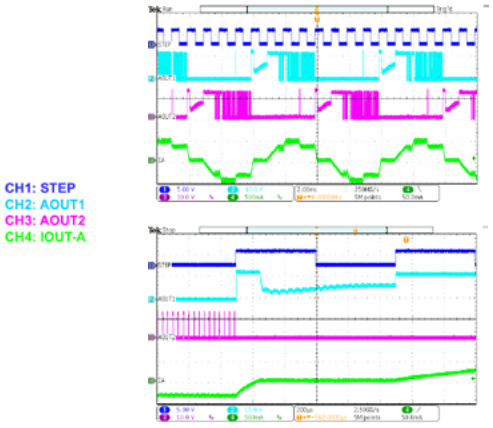


Features

- Wide 4V to 32V Input Voltage (V_{IN}) Range
- 1A Maximum Output Current (I_{OUT})
- Two Internal Full-Bridge Drivers
- Low On Resistance (HS = 340mΩ, LS = 240mΩ)
- Up to 1/32-Step Microstepping
- Internal Current-Sense and Regulation
- Serial Control Interface
- Back EMF (BEMF) Measurement
- Automatic Hold Current
- Unipolar Stepper Motor Support
- Diagnostic Functions, Including:
  - Rotor Stall Detection
  - Open-Load Detection
  - Over-Current Protection (OCP)
  - Over-Voltage Protection (OVP)
  - Under-Voltage Lockout (UVLO)
  - Over-Temperature (OT) Warning and Shutdown
  - Low-Temperature Detection
- Available in a Space-Saving QFN-18 (3mmx4mm) Package

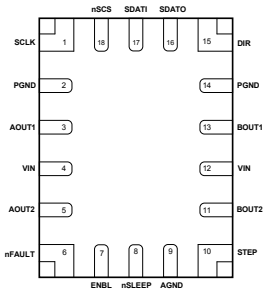
Stall Detection with Back EMF Measurement

The MPQ6609 has the ability to measure the back EMF (BEMF) of the stepper motor. Logic in the MPQ6609 processes the digitized BEMF information, and can provide rotor stall indication. These features are configured using an SPI interface. The BEMF value can also be directly read via a microcontroller, allowing for the use of more advanced diagnostics like load torque measurement.



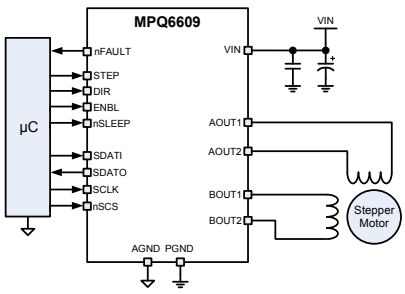
Low $R_{DS(ON)}$ and Internal Current-Sensing

The MPQ6609's H-bridge on resistance ($R_{DS(ON)}$) is very low, which allows up to 1A of motor winding current with very little power loss. In addition, internal current measurement means that no external current measurement shunt resistors are required.



Small Solution Size with Simple External Components

Available in a very small QFN-18 (3mmx4mm) package, the MPQ6609 is the smallest stepper motor solution currently on the market that is capable of this level of current. The MPQ6609 has a built-in low-dropout (LDO) regulator and charge pump, and integrates the required capacitors, so few external components are needed for the circuit.



Brushed DC Motors & Solenoid Drivers

MPS H-bridge drivers are designed to drive brushed DC motors and solenoids in consumer appliances, toys, automotive, and industrial applications. Many different interfaces are supported, including SPI control, PWM interfaces, and separate high-side (HS) and low-side (LS) controls. This product family includes 1/2 H-bridge devices that can be used to regulate current in solenoids, as well as single and dual H-bridge parts to drive brushed DC motors of various sizes, from 1.8V to 65V and up to 8A. Some parts are also qualified for automotive use (AEC-Q100).

Features

- Integrated Half-/Full-Bridge Drivers
- Low On Resistance
- Internal Charge Pump
- Low Quiescent/Sleep Current
- Over-Current Protection (OCP) and Over-Temperature Protection (OTP)
- Thermally Enhanced Packages

MPS Advantages

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

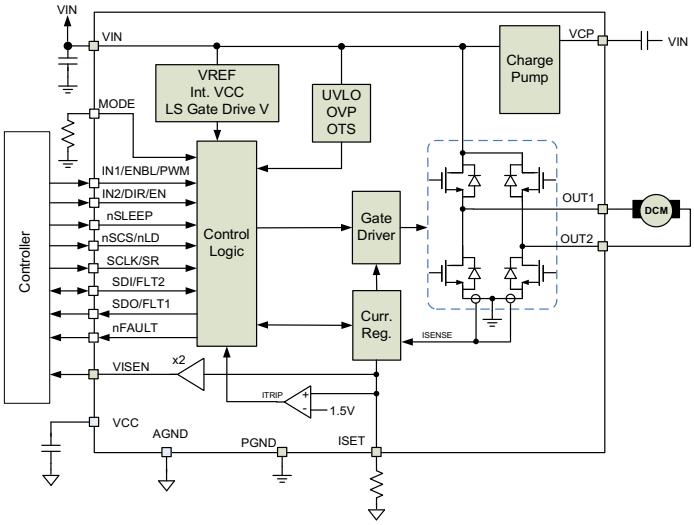
Brushed DC Motor & Solenoid Drivers

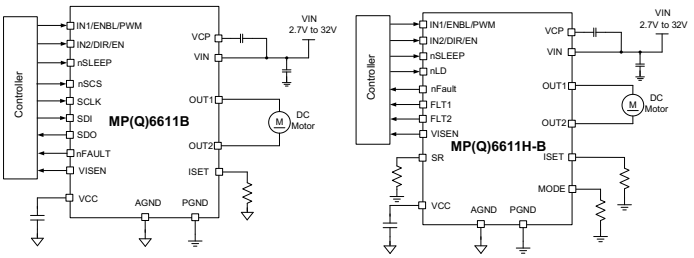
	Part Number	V_{IN} (Min) (V)	V_{IN} (Max) (V)	# of Half-Bridges	I_{OUT} (Max) (A)	$R_{DS(ON)}$ (HS + LS) (mΩ)	Control Interface	Package	Notes
	MP6610	4	55	1	3	100 + 120	EN/IN	TSOT23-8, SOIC-8	Half-bridge
	MP8040	7.5	24	1	9	100	PWM	SOIC-8EP	Half-bridge
	MP1930	9	18	1	10	11	HS/LS	QFN-26 (7x7)	Half-bridge, 18V to 75V V_{IN} for MOSFETs
S	**MP6592**	4.5	22	1	12	18 + 7.5	PWM	TQFN-13 (3x3)	Half-bridge
	MP6513L	2.5	5.5	2	0.6	500 + 500	IN1/IN2	TSOT23-6	Low-power H-bridge
	MP6513	2.5	21	2	0.8	500 + 500	IN1/IN2	TSOT23-6	Simple H-bridge
	MP6550	1.8	22	2	2	120 + 120	IN1/IN2	QFN-12 (2x2)	H-bridge, input logic voltage (V_{IL_MAX}: 0.4V, V_{IH_MIN}: 1.6V)
N	**MP6550A**	1.8	22	2	2	120 + 120	IN1/IN2	QFN-12 (2x2)	H-bridge, input logic voltage (V_{IL_MAX}: 0.8V, V_{IH_MIN}: 1.29V)
	MP6614	5	35	2	2	280 + 220	IN1/IN2	SOIC-8EP	H-bridge
	MP6515	5.4	35	2	2.8	250 + 250	PHASE/EN	QFN-20 (3x4), TSSOP-16EP	H-bridge motor driver
	MP6516	5.4	35	2	2.8	250 + 250	EN/IN	TSSOP-16EP	Dual half-bridge driver
	MP6522	5.4	35	2	3.2	250 + 250	IN1/IN2	QFN-24 (5x5)	Simple H-bridge motor driver
	MP8046	7.5	28	2	5	165	PWM	TSSOP-20F	Full-bridge driver
	MP6519	2.5	28	2	5	65 + 65	PWM	QFN-19 (3x3)	H-bridge current regulator, 64kHz internal clock frequency
	MP6519A	2.5	28	2	5	65 + 65	PWM	QFN-19 (3x3)	H-bridge current regulator, 32kHz internal clock frequency
	MP6551	2.5	14	2	5	15 + 12	EN/IN	QFN-14 (2.5x3)	Dual half-bridge driver
	MP6619	5.4	28	2	5	65 + 65	IN1/IN2	QFN-19 (3x3)	H-bridge
	MP6619L	2.5	28	2	5	65 + 65	IN1/IN2	QFN-19 (3x3)	H-bridge with external VCC and OCP_SET pin
	MP6613	4.5	45	2	5	75 + 75	Prog	QFN-28 (4x5), TSSOP-28EP	Simple H-bridge with three prog. control modes
	MP6612	4	40	2	5	70 + 45	IN1/IN2	TSSOP-20EP	H-bridge with current sense
	MP6612D	4	40	2	5	70 + 45	ENBL/DIR	TSSOP-20EP	H-bridge with current sense
S	**MP6611**	2.7	32	2	7	20 + 20	SPI	QFN-20 (4x4)	H-bridge with prog. SR
S	**MP6611B**	2.7	32	2	15	20 + 20	SPI	QFN-20 (4x4)	H-bridge with prog. SR

Part Number	V_{IN} (Min) (V)	V_{IN} (Max) (V)	# of Half-Bridges	I_{OUT} (Max) (A)	$R_{DS(ON)}$ (HS + LS) (mΩ)	Control Interface	Package	Notes
S **MP6611H-B**	2.7	32	2	15	20 + 20	Prog	QFN-20 (4x4)	H-bridge with 3 configurable input logics and prog. SR
MP6615	4.75	40	2	8	11 + 11	Prog	TQFN-26 (6x6)	H-bridge with 3 configurable input logics
MP6523	7	28	3	0.9	1100	SPI	QFN-24 (4x4)	Motor driver with serial input control
MP6507	2.7	15	4	0.7	500 + 500	IN1/IN2	TSSOP-16EP, QFN-16 (3x3), QFN-16 (4x4)	Dual H-bridges
MP6508	2.7	18	4	1.2	250 + 250	IN1/IN2	TSSOP-16EP, QFN-16 (4x4)	Dual H-bridges
MP6508A	2.7	18	4	1.2	250 + 250	IN1/IN2	QFN-16 (3x3)	Dual H-bridges
MP6604A	4.5	45	4	2.5	150 + 150	EN/IN	QFN-28 (4x5), TSSOP-28EP	Simple dual H-bridge driver
MP6604B	4.5	45	4	2.5	150 + 150	PHASE/EN	QFN-28 (4x5), TSSOP-28EP	Simple dual H-bridge driver
MP6604C	4.5	45	4	2.5	150 + 150	HS/LS	QFN-28 (4x5), TSSOP-28EP	Simple dual H-bridge driver
MP8049S	5	26	4	5.5	140	PWM	QFN-40 (5x5)	Dual full-bridge driver
MP6603	8	55	4	5	65 + 50	PWM	QFN-25 (4x5)	Dual full-bridge driver, selectable input interface
MP6526	7	28	6	0.9	1100	SPI	SOIC-28, QFN-24 (4x4), QFN-24 (5x5)	Serial input control
MP6527	5.5	40	10	0.8	1300	SPI	TSSOP-28EP	Serial input control
MPQ6610-AEC1	4	55	1	3	100 + 120	EN/IN	TSOT23-8, SOIC-8	Half-bridge, AEC-Q100 qualified
MPQ6614-AEC1	5	35	2	1.5	280 + 220	IN1/IN2	QFN-8 (2x3)	H-bridge DC motor driver, AEC-Q100 qualified
MPQ6519-AEC1	3	28	2	5	65 + 65	PWM	QFN-19 (4x4)	H-bridge current regulator, AEC-Q100 qualified
MPQ6619-AEC1	2.7	28	2	5	65 + 65	IN1/IN2	QFN-19 (4x4)	H-bridge, AEC-Q100 qualified
MPQ6612A-AEC1	4	40	2	5	63 + 40	IN1/IN2	QFN-18 (3x4)	H-bridge with current sense, AEC-Q100 qualified
MPQ6612A-D-AEC1	4	40	2	5	63 + 40	ENBL/DIR	QFN-18 (3x4)	H-bridge with current sense, AEC-Q100 qualified
S **MPQ6611-AEC1**	2.7	32	2	7	20 + 20	SPI	QFN-20 (4x4)	H-bridge with prog. slew rate, AEC-Q100 qualified
S **MPQ6611B-AEC1**	2.7	32	2	15	20 + 20	SPI	QFN-20 (4x4)	H-bridge with prog. slew rate, AEC-Q100 qualified
S **MPQ6611H-B-AEC1**	2.7	32	2	15	20 + 20	Prog	QFN-20 (4x4)	H-bridge with 3 configurable input logics and prog. slew rate, AEC-Q100 qualified
MPQ6615-AEC1	4.75	40	2	8	11 + 11	Prog	TQFN-26 (6x6)	H-bridge with 3 configurable input logics, AEC-Q100 qualified
MPQ6523-AEC1	7	28	3	0.9	1100	SPI	QFN-24 (4x4)	Serial input control, AEC-Q100 qualified
MPQ6524-AEC1	7	28	4	0.9	1100	SPI	QFN-24 (4x4)	Serial input control, AEC-Q100 qualified
MPQ6526-AEC1	7	28	6	0.9	1100	SPI	QFN-24 (4x4), QFN-24 (5x5)	Serial input control, AEC-Q100 qualified
MPQ6626-AEC1	5.5	40	6	0.8	1300	SPI	TSSOP-28EP	Serial input control, AEC-Q100 qualified
MPQ6628-AEC1	5.5	40	8	0.8	1300	SPI	TSSOP-28EP	Serial input control, AEC-Q100 qualified
MPQ6527-AEC1	5.5	40	10	0.8	1300	SPI	TSSOP-28EP	Serial input control, AEC-Q100 qualified

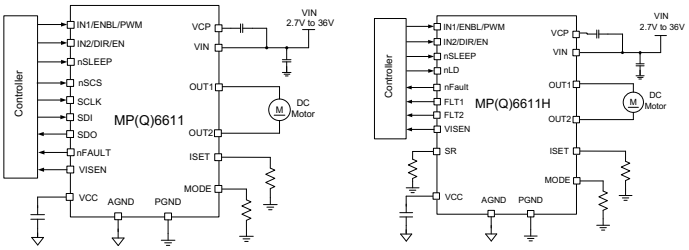
MP(Q)6611B/MP(Q)6611H-B

32V, 15A Peak, H-Bridge Motor Drivers





QFN-20 (4mmx4mm)



SPI Version HW Version

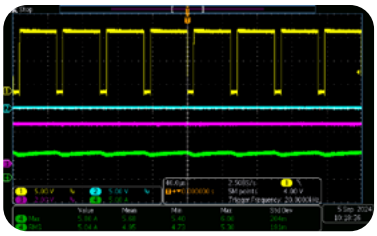
Features

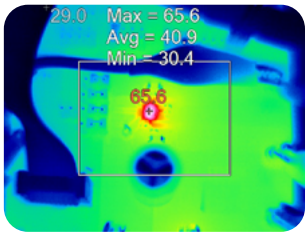
- 2.7V to 32V Input Voltage (V_{IN}), 15A Peak Output Current (I_{OUT})
- Internal Full H-Bridge Driver Supports 100% Duty Cycle
- MOSFET On Resistance ($R_{DS(ON)}$): HS + LS = 40mΩ
- Serial Control Interface: MP(Q)6611B
- Hardware Inteface: MP(Q)6611H-B
- MODE Selection
- Set Input PWM/DIR, IN1/IN2, Independent Pulse-Width Modulation (PWM), and Parallel Settings
- 3.3V and 5V Compatible Logic Supply
- Controlled Slew Rate
- Configurable Charge Pump Frequency
- Automatic Synchronous Rectification (SR)
- Internal Current-Sensing
- Diagnostic and Protection Features:
  - Overload Detection (OLD), Over-Voltage Protection (OVP), Under-Voltage Lockout (UVLO), Over-Current Protection (OCP), Over-Temperature Protection (OTP)
  - Fault Indication Output
- Available in a QFN-20 (4mmx4mm) Package with Wettable Flanks
- Available in AEC-Q100 Grade 1

Mode Selection for Input/Output Configuration

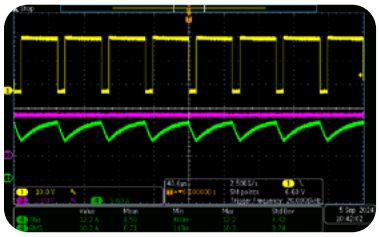
Mode	Set-Up	Input Interface	Output Configuration
1	GND	IN1/IN2	Full Bridge
2	VCC	DIR/ENBL	Full Bridge
3	Float	IN1/IN2	2 Half-Bridges
4	51kΩ ±5% to GND	PWN/EN	Parallel Half-Bridge

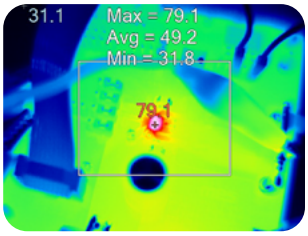
Full Bridge, V_{IN} = 14V, 20kHz, Slew Rate = 184V/µs, 5A RMS Current, 37°C Temperature Rise





Parallel Half-Bridge, V_{IN} = 24V, 20kHz, Slew Rate = 184V/µs, 10A RMS Current, 48°C Temperature Rise





Brushless DC (BLDC) Pre-Drivers

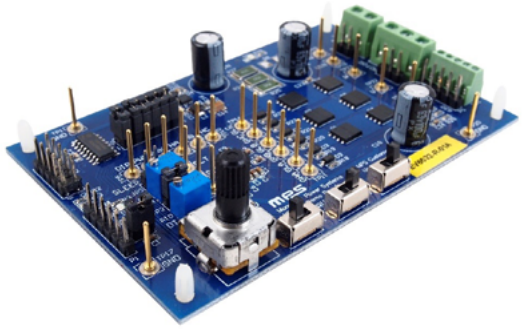
MPS brushless DC (BLDC) motor pre-drivers are designed to drive BLDC motors and permanent magnet synchronous motors (PMSMs) used in robotics, industrial, automotive, and consumer applications, such as power tools, fans, pumps, and e-bikes. These MPS parts can operate from 5V to 100V, and can spin motors larger than 1,000W. Unique features include boosted gate drive supplies, configurable dead time, full protection features, and 100% duty cycle capability. Single-channel and three-channel parts are available with optional features including built-in buck regulators, current-sense amplifiers, and Hall commutation logic. Some parts are qualified for automotive use (AEC-Q100).

Features

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

MPS Advantages

- Small Package Option Significantly Reduces PCB Space
- Wide Input Range to Support Different Applications
- Extensive Protection Functions Increase System Reliability



Brushless DC Pre-Drivers

	Part Number	Supply Voltage (Min) (V)	Supply Voltage (Max) (V)	V_{SW} (Max) (V)	# of Half-Bridges	I_{SINK}/I_{SOURCE} (A)	Control Interface	Package	Notes
N	**MP6590A**	7.5	80	80	-	1	ENBL/ON	QFN-11 (3x4)	High-side MOSFET driver
	MP1921A	9	18	100	1	2.5/1.5	INH/INL	SOIC-8EP, QFN-8 (3x3), QFN-9 (3x3), QFN-10 (4x4)	Half-bridge gate driver
	MP1921B	9	18	100	1	2.5/1.5	INH/INL	QFN-10 (3x3)	Half-bridge gate driver
	MP1924A	8	15	100	1	4.5/3	INH/INL	QFN-10 (4x4), SOIC-8, SOIC-8E	Half-bridge gate driver
	MP1925	8	15	100	1	4.5/3	INH/INL	QFN-8 (4x4)	Half-bridge gate driver
	MP1922	5	15	100	1	4/3	INH/INL	QFN-22 (4x5)	Half-bridge pre-driver, current-sense amplifier, slew rate control
	MP1923	5	17	100	1	8/7	INH/INL	QFN-8 (4x4), QFN-10 (4x4), SOIC-8	High-frequency half-bridge gate driver
	MP6528	5	60	60	2	1/0.8	EN/PWM	QFN-28 (4x4)	H-bridge pre-driver
	MP6530	5	60	60	3	1/0.8	EN/PWM	QFN-28 (4x4), TSSOP-28EP	3-phase pre-driver
	MP6531A	5	60	60	3	1/0.8	HS/LS	QFN-28 (4x4), TSSOP-28EP	3-phase pre-driver
	MP6532	5	60	60	3	1/0.8	PWM/DIR, 3 Hall Inputs	QFN-28 (4x4), TSSOP-28EP	3-phase pre-driver with commutation logic
	MP6534	5	55	55	3	1/0.8	EN/PWM	QFN-40 (5x5)	3-phase pre-driver with buck regulator

N New Product S Sampling Product P Preview Product

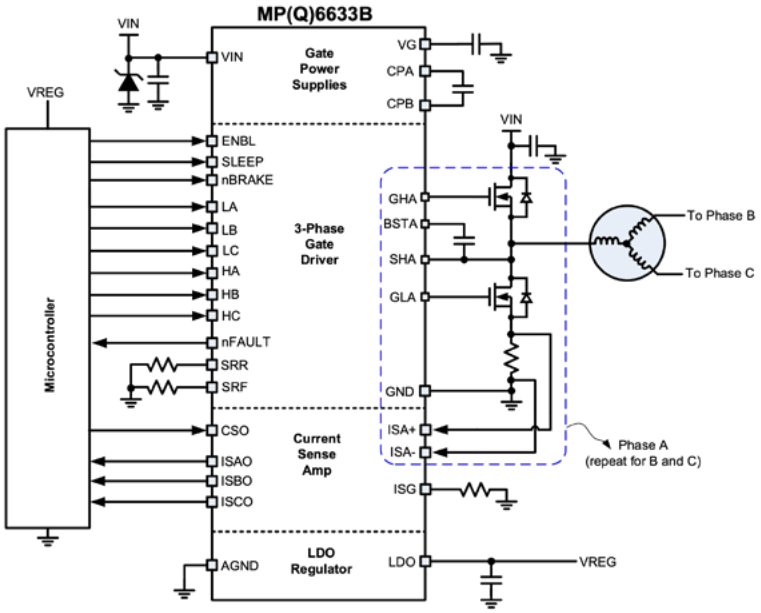
Brushless DC (BLDC) Pre-Drivers

	Part Number	Supply Voltage (Min) (V)	Supply Voltage (Max) (V)	V_{SW} (Max) (V)	# of Half-Bridges	I_{SINK} / I_{SOURCE} (A)	Control Interface	Package	Notes
	MP6535	5	55	55	3	1/0.8	PWM/DIR, 3 Hall Inputs	QFN-40 (5x5)	3-phase pre-driver with commutation logic and buck regulator
S	**MP6633A**	5	50	-	3	1.1/0.7	HS/LS	QFN-34 (4x5)	3-phase pre-driver with voltage regulator and single-channel sense amplifier
S	**MP6633B**	5	50	-	3	1.1/0.7	HS/LS	QFN-48 (6x6)	3-phase pre-driver with voltage regulator and 3-channel sense amplifier
	MP6537	8	100	100	3	1/0.8	EN/PWM	QFN-28 (4x5)	3-phase pre-driver
	MP6538	8	100	100	3	1/0.8	PWM/DIR, 3 Hall Inputs	QFN-28 (4x5)	3-phase pre-driver with Hall commutation logic
	MP6539	8	100	100	3	1/0.8	HS/LS	QFN-28 (4x5), TSSOP-28EP	3-phase pre-driver with internal LDO, prog. OCP
	MP6539B	8.5	14	100	3	1/0.8	HS/LS	QFN-28 (4x5), TSSOP-28EP	3-phase pre-driver
	MP6539C	8.5	14	80	3	1/0.8	HS/LS	QFN-28 (4x5)	3-phase pre-driver
N	**MPQ6590A-AEC1**	7.5	80	80	-	1	ENBL/ON	QFN-11 (3x4)	High-side MOSFET driver
	MPQ1922-AEC1	5	15	100	1	4/3	INH/INL	QFN-22 (4x5)	Half-bridge pre-driver, current-sense amplifier, slew rate control
	MPQ1923-AEC1	5	17	100	1	8/7	INH/INL	QFN-8 (4x4), QFN-10 (4x4)	High-frequency half-bridge gate driver
	MPQ6528-AEC1	5	60	60	2	1/0.8	EN/PWM	QFN-28 (4x5)	H-bridge pre-driver with PWM/EN inputs, AEC-Q100 qualified
	MPQ6641-AEC1	6	40	-	2	1/0.8	EN/IN, SPI	QFN-32 (5x5)	H-bridge pre-driver with SPI and internal current-sense amp, AEC-Q100 qualified
	MPQ6530-AEC1	5	60	60	3	1/0.8	EN/PWM	QFN-28 (4x5)	3-phase pre-driver, AEC-Q100 qualified
	MPQ6531-AEC1	5	60	60	3	1/0.8	HS/LS	QFN-28 (4x5)	3-phase pre-driver, AEC-Q100 qualified
	MPQ6532-AEC1	5	60	60	3	1/0.8	PWM/DIR, 3 Hall Inputs	QFN-28 (4x5)	3-phase pre-driver with commutation logic, AEC-Q100 qualified
	MPQ6533-AEC1	6	40	-	3	1/0.8	EN/IN, SPI	QFN-32 (5x5)	3-channel pre-driver with SPI interface and internal current-sense amp, AEC-Q100 qualified
S	**MPQ6633A-AEC1**	5	50	-	3	1.1/0.7	HS/LS	QFN-34 (4x5)	3-phase pre-driver with voltage regulator and single-channel sense amplifier
S	**MPQ6633B-AEC1**	5	50	-	3	1.1/0.7	HS/LS	QFN-48 (6x6)	3-phase pre-driver with voltage regulator and 3-channel sense amplifier
N	**MPQ6539-AEC1**	8	80	80	3	1/0.8	HS/LS	QFN-28 (4x5)	3-phase pre-driver with internal LDO, prog. OCP, AEC-Q100 qualified
S	**MPQ6620A-AEC1**	6	40	-	8	0.064/ 0.064	SPI	QFN-48 (7x7)	8-channel pre-driver with 2x current-sense amplifiers, AEC-Q100 qualified
S	**MPQ6620B-AEC1**	6	40	-	8	0.064/ 0.064	SPI	QFN-40 (6x6)	8-channel pre-driver, AEC-Q100 qualified

N New Product S Sampling Product P Preview Product

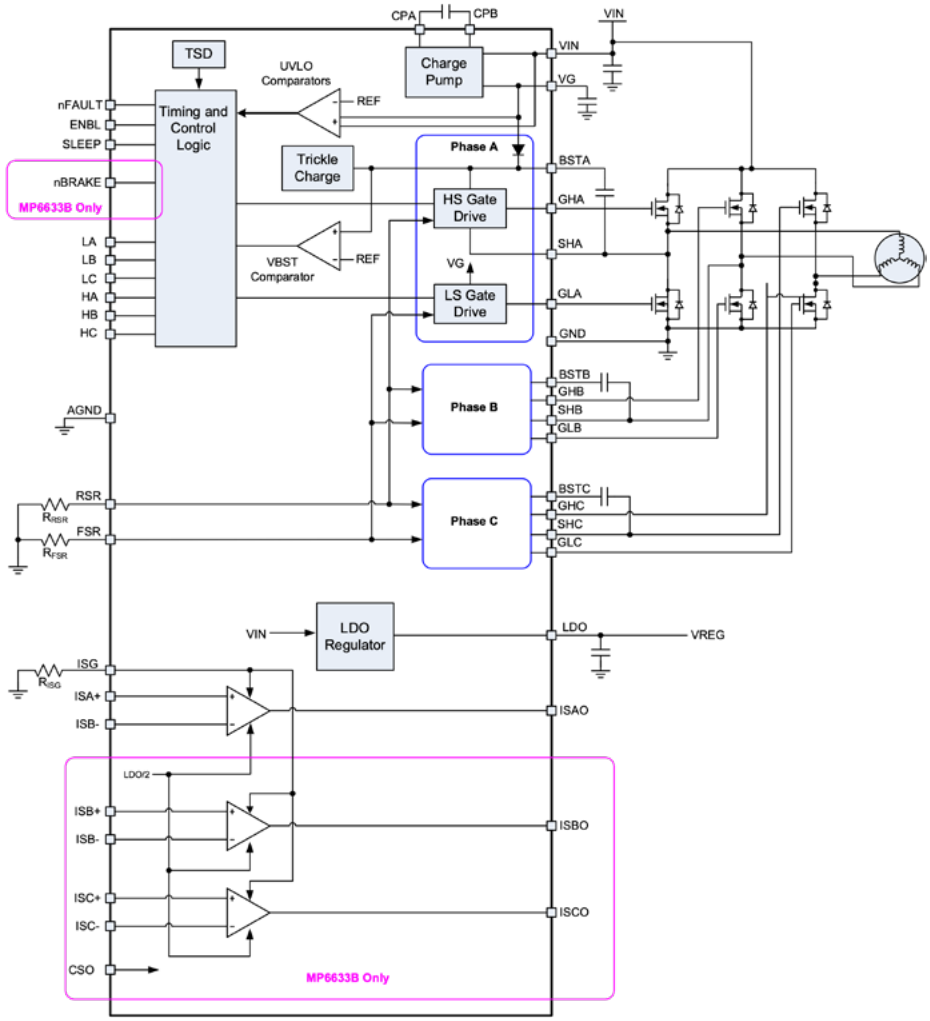
MP(Q)6633A/MP(Q)6633B

50V, Three-Phase BLDC Pre-Drivers

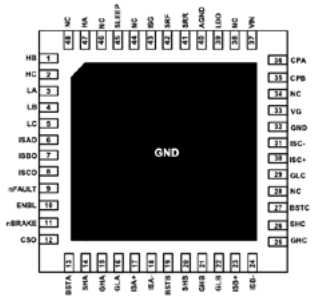


Features

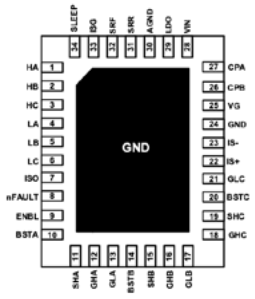
- 5V to 50V Input Voltage (V_{IN}) Range
- 1.1A Sink Gate Drive Current
- Bootstrap Gate Driver with Trickle-Charge Circuit Supports 100% Duty Cycle Operation
- Integrated 50mA, 2% Accuracy LDO Voltage Regulator
- Configurable Slew Rate
- Global Enable Input for Safety Shutdown
- MP(Q)6633A: Single-Channel Current-Sense Amplifier
- MP(Q)6633B: Three-Channel Current-Sense Amplifier
- Protection Features:
  - Automatic Dead Time Generation
  - Over-Temperature Protection (OTP) and Under-Voltage Lockout (UVLO)
  - Fault Indication Output
- Available in a QFN-34 (4mmx5mm) Package (MP(Q)6633A) or a QFN-48 (6mmx6mm) Package (MP(Q)6633B)



MP(Q)6633B: QFN-48 (6mmx6mm)

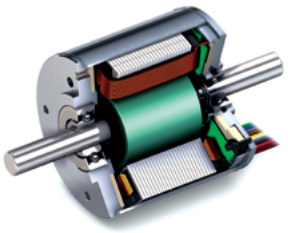


MP(Q)6633A: QFN-34 (4mmx5mm)



Integrated Brushless DC (BLDC) Motor Drivers

These integrated brushless DC (BLDC) motor drivers use MPS's unique IC process technology, which allows for the integration of large, low-$R_{DS(ON)}$ power MOSFETs into ICs to directly drive BLDC motors, enabling the smallest single-chip BLDC driver solutions available on the market. MPS's integrated BLDC motor drivers are designed to drive BLDC motors and permanent magnet synchronous motors (PMSMs) used in robotics, industrial, automotive, and consumer applications, such as power tools, fans, pumps, and e-bikes. MPS solutions offer a variety of selectable input modes, such as PWM/ENBL inputs, HS/LS inputs, Hall signal inputs, and more. They also feature 100% duty cycle operation, robust protection functions, and an integrated current-sense amplifier. Some parts are qualified for automotive use (AEC-Q100).



MPS Advantages

- Low On Resistance Significantly Improves Thermal Performance
- Wide Input Range to Support Different Applications
- Extensive Protection Functions Increase System Reliability
- Integrated Current-Sense Amplifier Reduces BOM Cost

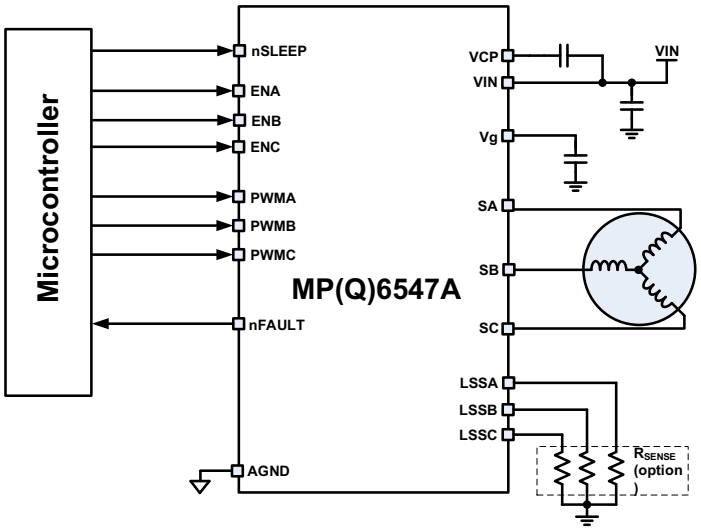
Integrated BLDC Motor Drivers

	Part Number	V_{IN} (Min) (V)	V_{IN} (Max) (V)	# of Half-Bridges	I_{OUT} (Max) (A)	$R_{DS(ON)}$ (HS + LS) (mΩ)	Control Interface	Package	Notes
	MP6543C	3	22	3	1.2	110 + 110	ENBL/PWM	QFN-24 (3x4)	3-phase power stage with 3 current-sense amplifers
	MP6543	3	12	3	2	110 + 110	ENBL/PWM	QFN-24 (3x4)	3-phase power stage with 3 current-sense amplifers
	MP6543A	3	12	3	2	110 + 110	HS/LS	QFN-24 (3x4)	3-phase power stage with 3 current-sense amplifers
	MP6543B	3	12	3	2	110 + 110	PWM/DIR, 3 Hall Inputs	QFN-24 (3x4)	3-phase power stage with 3 current-sense amplifers
	MP6543H	3	22	3	2	110 + 110	ENBL/PWM	QFN-24 (3x4)	3-phase power stage with 3 current-sense amplifers
	MP6543H-A	3	22	3	2	110 + 110	HS/LS	QFN-24 (3x4)	3-phase power stage with 3 current-sense amplifers
	MP6543H-B	3	22	3	2	110 + 110	PWM/DIR, 3 Hall Inputs	QFN-24 (3x4)	3-phase power stage with 3 current-sense amplifers
	MP6545	4.5	45	3	2.5	150 + 150	HS/LS	QFN-28 (4x5), TSSOP-28EP	3-channel power stage
	MP6545A	4.5	45	3	2.5	150 + 150	HS/LS	QFN-28 (4x5), TSSOP-28EP	3-channel power stage, separate GND for A/B/C phases
	MP6546	3.5	22	3	3	150 + 150	I²C Hall, Angle Sensor Inputs	QFN-20 (3x4)	3-phase power stage, 1MHz I²C Interface
	MP6536	5	26	3	5.5	140 + 140	ENBL/PWM	QFN-40 (5x5)	3-channel half-bridge driver
	MP6540	5.5	35	3	3	50 + 50	ENBL/PWM	QFN-26 (5x5)	3-phase power stage with 3 current-sense amplifers
	MP6540A	5.5	35	3	3	50 + 50	HS/LS	QFN-26 (5x5)	3-phase power stage with 3 current-sense amplifers
	MP6540H	5.5	50	3	5	45 + 45	ENBL/PWM	QFN-26 (5x5)	3-phase power stage with 3 current-sense amplifers
	MP6540HA	5.5	50	3	5	45 + 45	HS/LS	QFN-26 (5x5)	3-phase power stage with 3 current-sense amplifers
	MP6541	4.75	40	3	8	15 + 15	ENBL/PWM	TQFN-26 (6x6)	3-phase power stage with 3 current-sense amplifers
	MP6541A	4.75	40	3	8	15 + 15	HS/LS	TQFN-26 (6x6)	3-phase power stage with 3 current-sense amplifers
N	**MP6549**	3	22	3	10	10 + 7	ENBL/PWM, HS/LS	QFN-26 (4x4)	3-phase power stage, parallel mode for high-current single half-bridge
S	**MPQ6547A-AEC1**	4	32	3	3	50 + 40	ENBL/PWM	QFN-18 (3x4)	3-phase power stage
	MPQ6541-AEC1	4.75	40	3	8	15 + 15	ENBL/PWM	TQFN-26 (6x6)	3-phase power stage with 3 current-sense amplifiers, AEC-Q100 qualified
	MPQ6541A-AEC1	4.75	40	3	8	15 + 15	HS/LS	TQFN-26 (6x6)	3-phase power stage with 3 current-sense amplifiers, AEC-Q100 qualified

N New Product S Sampling Product P Preview Product

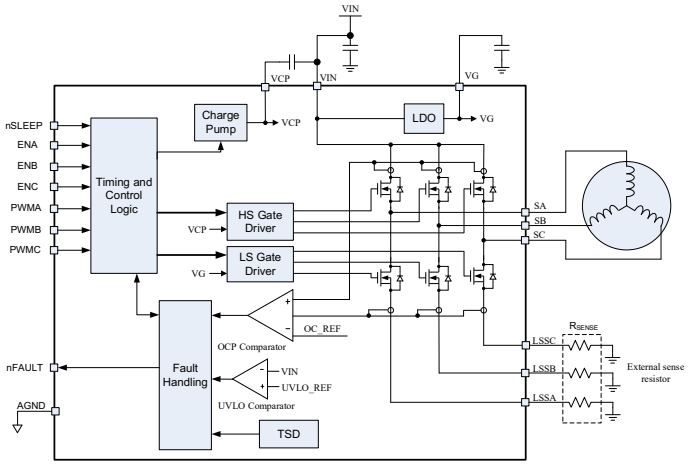
MP(Q)6547A

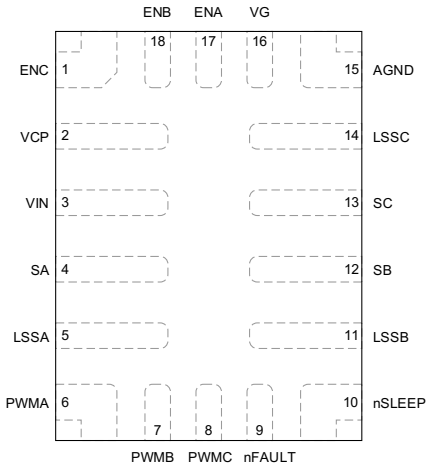
36V, 3A, Three-Phase Power Stages



Features

- 4V to 36V Input Voltage (V_{IN})
- 3A Continuous and 6A Peak Output Current (I_{OUT})
- Three Integrated Half-Bridge Drivers
- MOSFET On Resistance ($R_{DS(ON)}$)
  - HS-FET: 70mΩ
  - LS-FET: 60mΩ
- Internal Charge Pump Supports 100% Duty Cycle Operation
- Automatic Synchronous Rectification
- PWM & EN Inputs
- Integrated Protection Features:
  - Under-Voltage Lockout (UVLO), Over-Voltage Protection (OVP), Over-Current Protection (OCP), Over-Temperature Protection (OTP)
  - Fault Indication Output
- Available in a QFN-18 (3mmx4mm) Package with Wettable Flanks
- Available in AEC-Q100 Grade 1



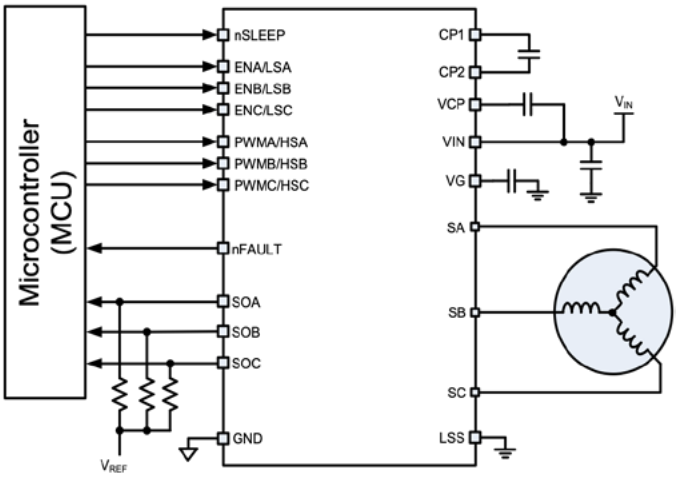


Input Logic Truth Table

ENx	PWMx	Sx
High	High	VIN
High	Low	GND
Low	-	High-Impedance (Hi-Z)

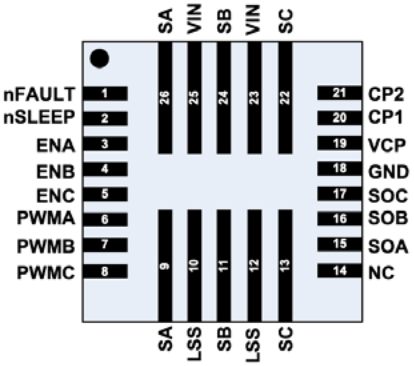
MP(Q)6541/MP(Q)6541A

40V, 8A, Three-Phase Power Stages

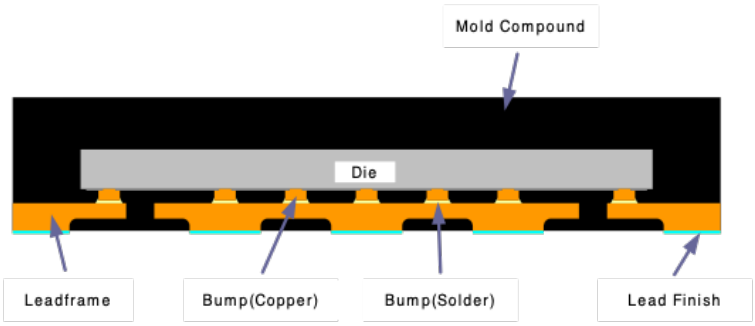


Features

- 4.75V to 40V Operating Supply Voltage
- Three Integrated Half-Bridge Drivers
- 8A of Continuous Output Current (I_{OUT})
- MOSFET On Resistance: 15mΩ per FET
- MP(Q)6541: PWM/ENBL Inputs, MP(Q)6541A: HS/LS Inputs
- Internal Charge Pump Supports 100% Duty Cycle Operation
- Automatic Synchronous Rectification
- Under-Voltage Lockout (UVLO) and Over-Voltage Protection (OVP)
- Thermal Shutdown Protection and Over-Current Protection (OCP)
- Integrated, Bidirectional Current-Sense Amplifiers
- Available in a TQFN-26 (6mmx6mm) Package
- The MPQ6541 and MPQ6541A Are Available in AEC-Q100 Grade 1



TQFN-26 (6mmx6mm)



Mesh Connect™ (No Wire Bond)

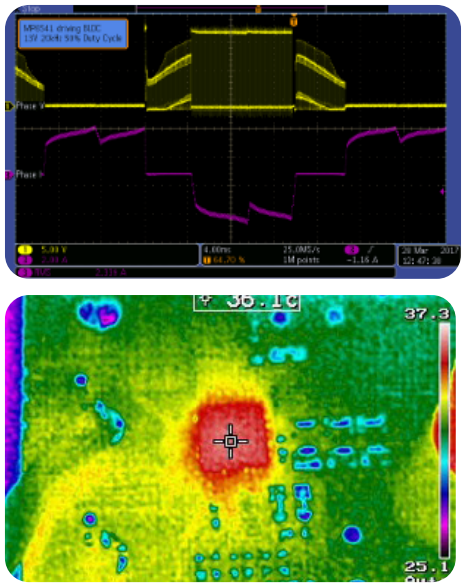
MP(Q)6541/A Size Comparison

The MP(Q)6541/A circuit can be 90% smaller than a pre-driver plus MOSFET solution.

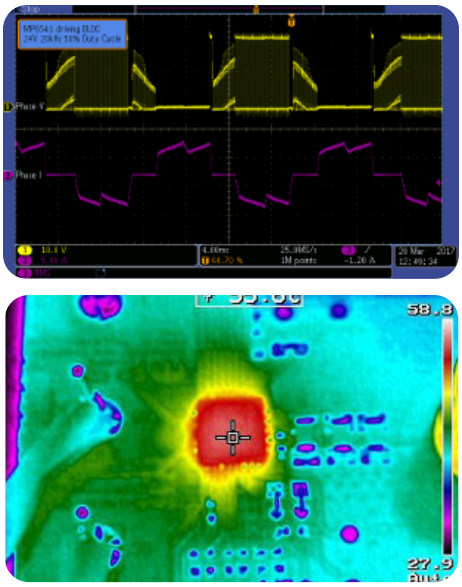
MP(Q)6541/A:
15mmx10mm

Pre-Driver plus 6 MOSFETs:
50mmx30mm

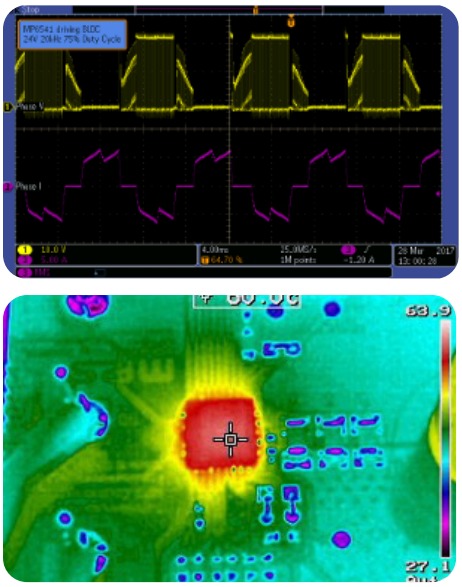
MP(Q)6541/A Thermal Test Data



13V, 20kHz, 50% DC, 2.8A Peak, 14°C Temperature Rise



24V, 20kHz, 50% DC, 5A Peak, 33°C Temperature Rise



24V, 20kHz, 75% DC, 6A Peak, 38°C Temperature Rise

Brushless DC (BLDC) Cooling Fan Drivers

MPS fan drivers are designed to drive consumer fans, industrial fans, automotive fans, notebook fans, PC fans, and more. These products include single-phase and three-phase drivers. Sine-wave control functionality can be optionally selected to meet different application scenarios. MPS fan drivers feature highly integrated, digital configurability, and open-/closed-loop speed control, as well as proprietary packaging and wafer process technology. Together, these advantages simplify design and minimize BOM for system applications. Some parts are qualified for automotive use (AEC-Q100).

MPS Advantages

- Integrated MOSFETs and Hall Sensor Minimize Solution Size
- Digital Configurability Simplifies Design
- Proprietary Packaging Technology Improves Thermal Performance
- Extensive Protection Functions Enhance System Reliability

Fan Drivers | Motor Drivers

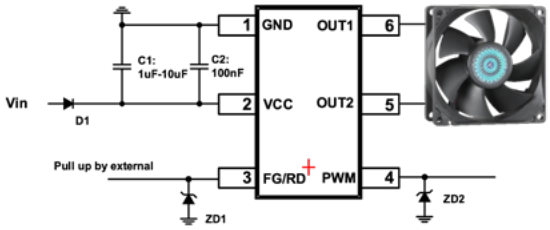
Part Number	V_{IN} (Min) (V)	V_{IN} (Max) (V)	# of Half-Bridges	I_{OUT} (Max) (A)	$R_{DS(ON)}$ (HS + LS) (mΩ)	Hall Sensor	Package	Notes
MP6505	4.5	16	2	0.4	600	External	TSSOP-16EP	Single-phase BLDC
MP6510	4.5	16	2	1.2	600	External	TSSOP-16EP	Single-phase BLDC
MP6517B	3.3	16	2	2	850	Integrated	TSOT23-6-L, TSOT23-6-R, TSOT23-6-SL, TSOT23-6-RSL	Single-phase BLDC, prog. speed curve, open-loop control

	Part Number	V_{IN} (Min) (V)	V_{IN} (Max) (V)	# of Half-Bridges	I_{OUT} (Max) (A)	$R_{DS(ON)}$ (HS + LS) (mΩ)	Hall Sensor	Package	Notes
	MP6650	3.3	18	2	2	850	Integrated	TSOT23-6-L, TSOT23-6-R, TSOT23-6-SL, TSOT23-6-RSL	Single-phase BLDC, open-loop speed control
	MP9517	3.3	18	2	2	850	Integrated	TSOT23-6-L, TSOT23-6-SL	Single-phase BLDC, open-loop speed control
	MP9518	3.3	18	2	1.2	850	Integrated	TSOT23-6, TSOT23-6-SL	Single-phase BLDC, open-loop speed control
	MP6652	3	18	2	1.3	850	Integrated	TSOT23-6-L, TSOT23-6-SL	Single-phase BLDC, prog. speed curve, open-loop control
	MP6652A	3	18	2	1	850	Integrated	TSOT23-6-L, TSOT23-6-SL	ESD enhanced
N	**MP6655**	3.5	18	2	2.5	250	Integrated	TSOT23-6-L, TSOT23-6-SL	Single-phase BLDC, prog. speed curve, open-/closed-loop control
	MP6653A	3.5	35	2	1.2	960	Integrated	TSOT23-6-L, TSOT23-6-SL, TQFN-6 (2x3)	Single-phase BLDC, prog. speed curve, open-/closed-loop control
N	**MP6653B**	3.5	35	2	1.2	960	Integrated	TSOT23-6-SL	Adds 2/3 FG option for 6-pole fan application based on the MP6653A
N	**MP6616B**	3.3	18	2	4	100	Integrated	QFN-10 (2x3)	ESD enhanced
N	**MP6617**	3.3	18	2	6	64	Integrated	QFN-10 (2.5x3)	Single-phase BLDC, prog. speed curve, open-/closed-loop control
N	**MP6658**	4.5	32	2	2.7	180	Integrated, External	QFN-12 (3x3)	Single-phase BLDC, prog. speed curve, open-/closed-loop control
	MP6630	2	5.5	3	1.4	800	Integrated	UTQFN-8 (2x3)	3-phase BLDC, prog. speed curve, open-loop control
	MP6630H	2	16	3	1.4	800	Integrated	UTQFN-8 (2x3)	3-phase BLDC, prog. speed curve, open-loop control
S	**MP6630E**	2	16	3	1.4	800	Integrated	UTQFN-8 (2x3)	ESD enhanced based on the MP6630H
	MP6631	3.6	24	3	3	160	External	QFN-26 (3x4)	3-phase BLDC, prog. speed curve, open-/closed-loop control
	MP6631H	3.6	35	3	3	160	External	QFN-26 (3x4)	3-phase BLDC, prog. speed curve, open-/closed-loop control
	MP6631A	3.6	35	3	3	160	External	QFN-26 (3x4)	FG output function at the align stage, based on the MP6631H
	MP6631B	3.6	35	3	3	160	External	QFN-26 (3x4)	Minimum soft-start time less than 0.5s, based on the MP6631H
	MP6637	2.5	5.5	3	1.3	350	Sensorless	SOT583	3-phase BLDC, open-loop speed control
	MP6637A	2.5	5.5	3	1.3	350	Sensorless	SOT583	FG/RD pin configurable based on the MP6637
N	**MP6638**	2.5	15	3	1.7	300	Sensorless	UTQFN-8 (2x2.5)	3-phase BLDC, open-loop speed control
N	**MP6636**	3.3	18	3	4	190	Sensorless	SOIC-8EP, TQFN-10 (4x4)	3-phase BLDC, prog. speed curve, open-/closed-loop control
N	**MP6634**	4.5	35	3	2	500	Sensorless	TQFN-12 (3x4)	3-phase BLDC, prog. speed curve, open-/closed-loop control
S	**MP6642**	4	35	3	5	100	Sensorless	TQFN-17 (3x4)	3-phase BLDC, prog. speed curve, open-/closed-loop control
	MP6632A	6	50	3	External FETs	External FETs	External	QFN-32 (4x4)	3-phase BLDC, prog. speed curve, open-/closed-loop control, trapezoid drive
	MP6632	6	50	3	External FETs	External FETs	External	QFN-32 (4x4)	3-phase BLDC, prog. speed curve, open-/closed-loop control, sine drive
N	**MP6635**	6	35	3	External FETs	External FETs	Sensorless	QFN-28 (5x5)	3-phase BLDC, prog. speed curve, open-/closed-loop control

	Part Number	V_{IN} (Min) (V)	V_{IN} (Max) (V)	# of Half-Bridges	I_{OUT} (Max) (A)	$R_{DS(ON)}$ (HS + LS) (mΩ)	Hall Sensor	Package	Notes
	MPQ6517B-AEC1	3.3	16	2	2	850	Integrated	TSOT23-6, TSOT23-6-SL	Single-phase BLDC, prog. speed curve, open-loop control, AEC-Q100 qualified
	MPQ6653A-AEC1	3.5	35	2	1.2	960	Integrated	TSOT23-6, TSOT23-6-SL, TQFN-6 (2x3)	Single-phase BLDC, prog. speed curve, open-/closed-loop control, AEC-Q100 qualified
N	**MPQ6653B-AEC1**	3.5	35	2	1.2	960	Integrated	TSOT23-6-SL	Add 2/3 FG option for 6-pole fan application based on the MPQ6653A
S	**MPQ6653C-AEC1**	3.5	35	2	1.2	960	Integrated	TSOT23-6-L, TSOT23-6-SL, TQFN-6 (2x3)	Add brake option to shorten the stop time based on the MPQ6653A
	MPQ6631H-AEC1	3.6	35	3	3	160	External	TQFN-26 (3x4)	3-phase BLDC, prog. speed curve, open-/closed-loop control, 1/3 Hall inputs, AEC-Q100 qualified
	MPQ6634-AEC1	4.5	35	3	2	500	Sensorless	TQFN-12 (3x4)	3-phase BLDC, prog. speed curve, open-/closed-loop control, AEC-Q100 qualified
N	**MPQ6632-AEC1**	6	50	3	External FETs	External FETs	External	QFN-32 (4x4)	3-phase BLDC, prog. speed curve, open-/closed-loop control, AEC-Q100 qualified
N	**MPQ6635-AEC1**	6	35	3	External FETs	External FETs	Sensorless	QFN-28 (5x5)	3-phase BLDC, prog. speed curve, open-/closed-loop control, AEC-Q100 qualified

MPQ6653A

35V, 1-Phase BLDC Fan Driver with Integrated Hall Sensor, AEC-Q100 Qualified

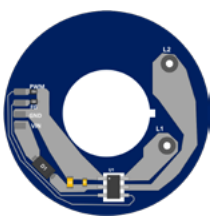


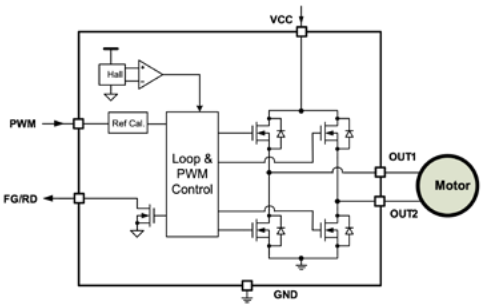
Features

- 3.5V to 35V Input Voltage (V_{IN}), Up to 1.2A Configurable Current Limit
- Embedded Hall Sensor
- MOSFET On Resistance (HS + LS = 960mΩ)
- Sinusoid or Linear Phase Commutation
- Configurable 4-Point Speed Curve
- FG or RD Output
- Open-Loop or Closed-Loop Speed Control
- Soft Acceleration Time
- Hall Leading/Lag Angle
- 50Hz to 100kHz PWM Input or DC Input
- Fixed 24kHz Output Switching Frequency (f_{SW})
- Integrated Protection Features:
  - LRP, Over-Voltage Protection (OVP), Under-Voltage Lockout (UVLO), Over-Current Protection (OCP), Short-Circuit Protection (SCP), Over-Temperature Protection (OTP), and Automatic Recovery
- Available in AEC-Q100 Grade 1
- Available in a TSOT23-6 or TQFN-6 (2mmx3mm) Wettable Flank Package

All-in-One, 1-Phase BLDC Fan Driver for Automotive Applications and Industrial Cooling

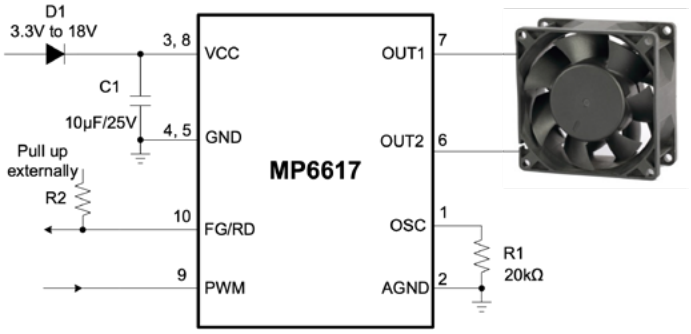
Small Size, Simple External Components





MP6617

18V, 6A Peak, Single-Phase BLDC Fan Driver with Integrated Hall Sensor and MOSFETs

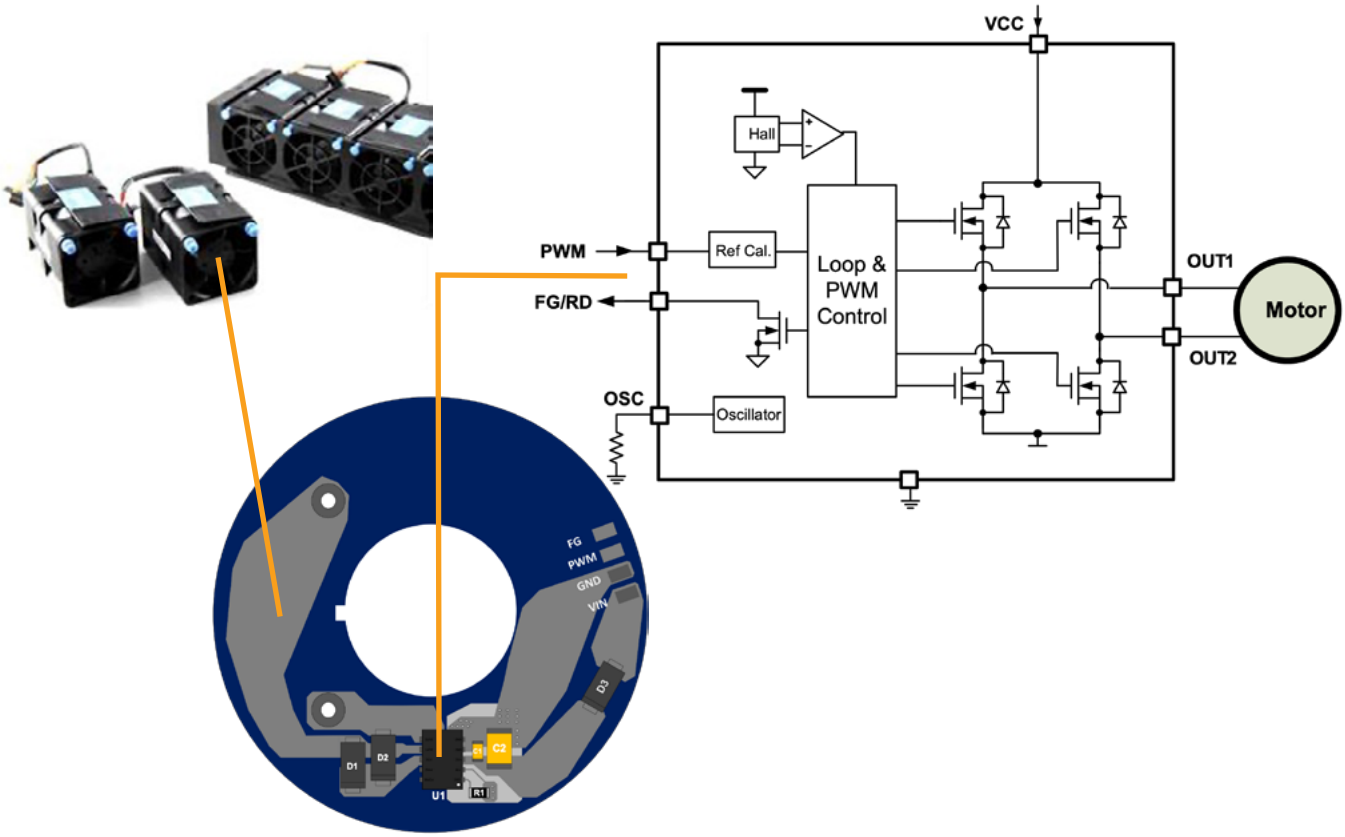


Features

- 3.3V to 18V Input Voltage (V_{IN}), Up to 6A Configurable Current Limit
- On-Chip Hall Sensor
- MOSFET On Resistance (HS + LS = 64mΩ)
- Configurable 6-Point Speed Curve
- Selectable Open-Loop or Closed-Loop Speed Control
- Soft Start (SS)
- Power-Saving Mode (IST ≤ 50A)
- Selectable FG or RD Output
- 60Hz to 100kHz PWM Input
- Fixed 27kHz Output Switching Frequency (f_{SW})
- Integrated Protection Features:
  - Rotor Deadlock (RD) Protection and Automatic Recovery
  - Short-Circuit Protection (SCP), Over-Voltage Protection (OVP), Under-Voltage Lockout (UVLO), Over-Current Protection (OCP), Over-Temperature Protection (OTP), and Automatic Recovery
- Available in a QFN-10 (2.5mmx3mm) Package

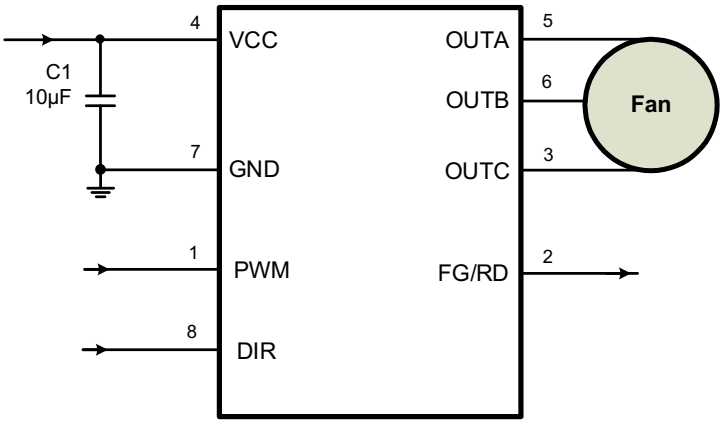
High-Current, All-in-One 1-Phase BLDC Fan Driver with Closed-Loop Speed Control

Small Size, Simple External Components



MP6638

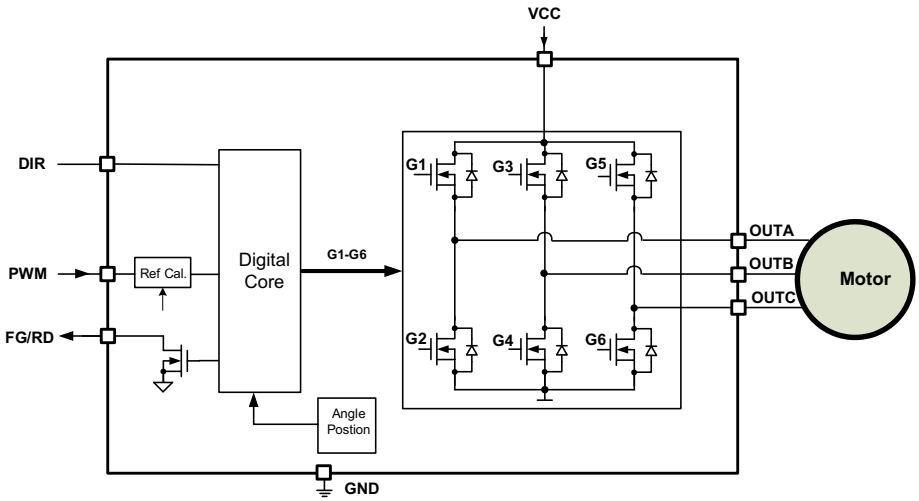
15V, 1.7A Peak, Sinusoidal Sensorless, 3-Phase BLDC Motor Driver with Integrated MOSFETs



Features

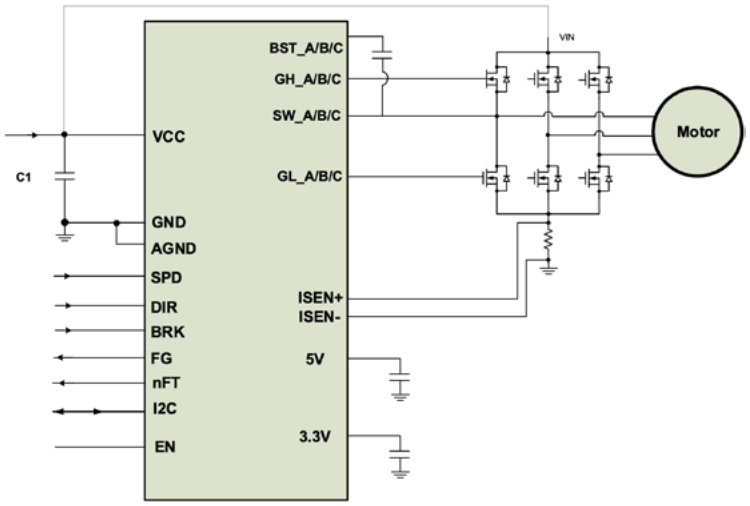
- 2.5V to 15V Input Voltage (V_{IN}) Operating Range
- Up to 1.7A Peak Phase Current
- Sinusoidal Sensorless Control
- Integrated MOSFET (HS + LS = 330mΩ)
- 50Hz to 100kHz Pulse-Width Modulation (PWM) Input
- Power-Saving Mode
- 30kHz PWM Output Frequency
- Direction Control
- FG, 1/2FG, 1/3FG, or RD Output
- Over-Current Protection (OCP), Over-Voltage Protection (OVP), Under-Voltage Lockout (UVLO), Short-Circuit Protection (SCP), Over-Temperature Protection (OTP), and Automatic Recovery
- Rotor-Lock Protection
- Available in a UTQFN-8 (2mmx2.5mm) Package

Small-Package, High-Current, All-in-One Sensorless Sinusoid BLDC Motor Driver for Notebooks and Gaming



MPQ6635

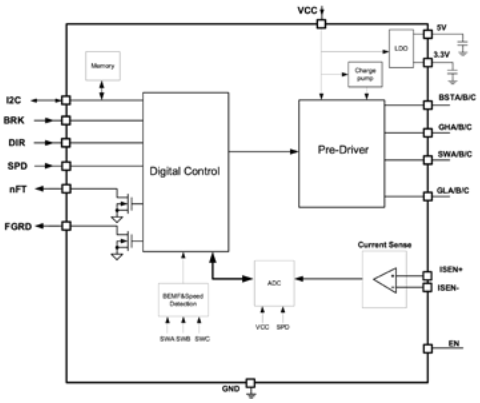
Three-Phase, Sensorless, FOC, BLDC Motor Driver, AEC-Q100 Qualified



Features

- 6V to 35V Input Voltage (V_{IN})
- Gate Driver Up to 0.7A/1A Source/Sink Gate Drive Current
- Supports 0V to 3.3V DC Input or 50Hz to 100kHz PWM Input
- Sensorless Field-Oriented Control (FOC)
- Closed-/Open-Loop Speed Control
- Configurable 6-Point Speed Curve
- Direction/Brake Input
- Rotational Speed Indicator and FG Signal
- 24kHz Switching Frequency (f_{SW})
- Configurable Soft Acceleration Time and Alignment Time
- Integrated Protection Features:
  - Over-Current Protection (OCP), Over-Voltage Protection (OVP), Over-Temperature Protection (OTP), LRP, and PLP
  - Fault Indication Output
- Available in a QFN-28 (5mmx5mm) Package with Wettable Flanks
- Available in AEC-Q100 Grade 1

Code-Free, Three-Phase, Sensorless, FOC BLDC Motor Driver with External N+N MOSFETs, AEC-Q100 Qualified



MPS Smart Drives

MPS Smart Drive is a motor microcontroller (MCU) for dedicated motor control applications. This new and innovative MCU family features:

- Cortex ARM Core Base
- High Integration with Pre-Driver and MOSFET
- Rich Peripheral for Motor Control
- Built-In Motor Algorithm: Sensored Field-Oriented Control (FOC), Sensorless FOC
- Flexible to Work with MPS Motor Drivers, Sensors, etc.

With an MPS Smart Drive total solution, customers can quickly develop motor control systems on both hardware and software perceptively, with great design scalability and quick time-to-market.

Motor Controllers & Smart Drivers

	Part Number	V_{IN} (Min) (V)	V_{IN} (Max) (V)	Core	RAM (KB)	Flash (KB)	Interface	Special Features	Grade	Package	Notes
	MP6570	3	3.6	-	-	-	SPI, I²C, RS-485	Up to 14-Bit Angular Sensor; Up to 80kHz f_{sw}; 10-Bit ADC with Prog Gain; Position/Speed/ Torque Operation Modes; Up to 32 Prog Target Addresses	Catalog	QFN-32 (4x4)	3-phase BLDC controller with high-accuracy angular sensor
S	**MP6572**	3	3.6	-	-	-	SPI, I²C, RS-485	Up to 14-Bit Angular Sensor; Up to 80kHz f_{sw}; 10-Bit ADC with Prog Gain; Position/Speed/ Torque Operation Modes; Up to 32 Prog Target Addresses	Catalog	QFN-32 (4x4)	Improved functionality based on the MP6570
S	**MPF56400**	1.8	3.6	Cortex-M4, 144MHz PLL	144	512	7x USART, 3x SPI, 1x QSPI, 4x I²C, 2x CAN	4x 12 Bits, 4.7Msps ADC; 4x RRIO OPA; 7x CMP; 2x DAC, 12 Bits, 1Msps; Up to 80 GPIOs; 2x DMA; 1x RTC; 2x 16-Bit Motor Timer with Up to 6.9ns Resolution; 4x 16-Bit Advanced Timer	Catalog	BGA-64 (5x5), TQFN-48 (5x5), QFN-48 (6x6), LQFP-48 (7x7)	Smart drive controller

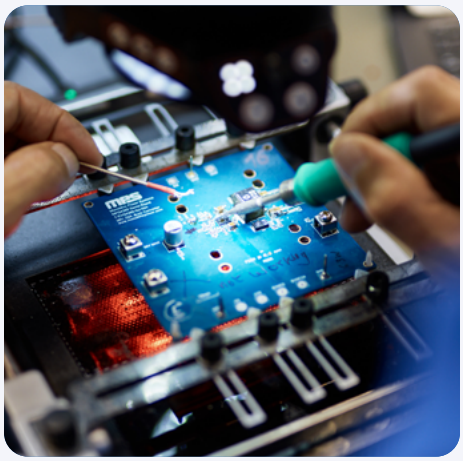
Notes

Why Choose MPS

For almost 30 years, Monolithic Power Systems (MPS) — headquartered in Kirkland, Washington, and listed on Nasdaq — has been powering the most important technological innovations, from electric vehicles to artificial intelligence, renewable energy systems to advanced medical devices. Our fully customized service, dedicated support, and steadfast partnerships have attracted industry leaders and startups on the cusp of groundbreaking discoveries.

MPS is agile, nimble, and forward-thinking, always looking for better, faster, and more efficient ways to drive technological progress. We forge ahead to create what's next and make a sustainable impact.

We are a global leader in powering the most important technological innovations of our lives — working with our customers to create what's next. We design high-performance, super efficient power solutions for a wide range of product categories — from AI datacenters to automation, advanced medical devices to robotics.



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On-Demand

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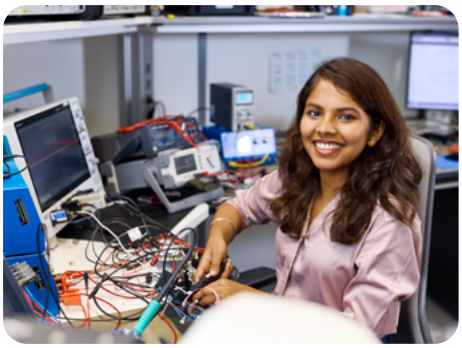
Virtual

Remote engineers provide virtual design sessions

- Product Recommendations
- Project Troubleshooting
- Technical Consulting

MPS NOW



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Motor Drivers