

## EV6543HA-L-00A

# 3V to 22V, Three-Phase Brushless DC Motor Driver Evaluation Board

#### **DESCRIPTION**

The EV6543HA-L-00A is an evaluation board for the MP6543HGL-A, a three-phase brushless DC motor driver.

The EV6543HA-L-00A operates from a maximum 22V supply voltage. It integrates three half-bridges consisting of six N-channel power MOSFETs. The rotor position information is provided by the Hall sensors assembled in the motor, and the driving control signals are generated by an external controller, such as an MCU or FPGA.

#### **ELECTRICAL SPECIFICATIONS**

Parameter	Symbol	Value	Units
Input voltage	V <sub>IN</sub>	3 to 22	V
LDO input voltage	V <sub>IN_LDO</sub>	3 to 22	V
VREF voltage	$V_{REF}$	3.3	V
VCC voltage	Vcc	3.3	V

#### **FEATURES**

- Wide 3V to 22V Input Voltage Range
- Built-In 3.3V, 100mA LDO Regulator
- Integrated Bidirectional Current-Sense Amplifiers
- Supports 100% Duty Cycle Operation
- Low-Side/High-Side Logic Input
- Over-Current Protection (OCP), Over-Temperature Protection (OTP)
- Fault Indication Output

#### **APPLICATIONS**

- Three-Phase Brushless DC Motors and Permanent Magnet Synchronous Motors
- Drones
- Robotics

All MPS parts are lead-free, halogen-free, and adhere to the RoHS directive. For MPS green status, please visit the MPS website under Quality Assurance. "MPS", the MPS logo, and "Simple, Easy Solutions" are trademarks of Monolithic Power Systems, Inc. or its subsidiaries.

#### **EV6543HA-L-00A EVALUATION BOARD**



(LxW) 6.35cmx6.35cm

Board Number	MPS IC Number		
EV6543HA-L-00A	MP6543HGL-A		

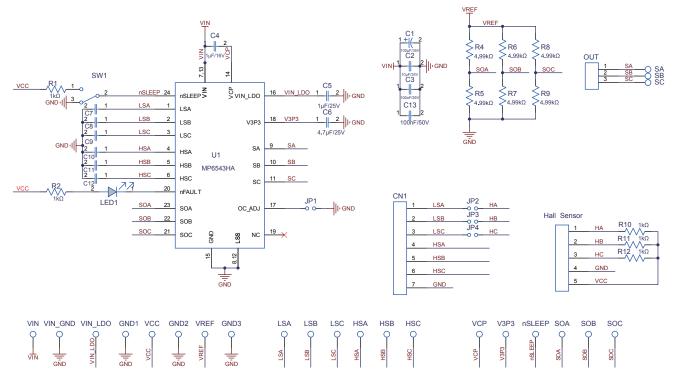


### **QUICK START GUIDE**

- 1. Attach the input voltage (3V  $\leq$  V<sub>IN</sub>  $\leq$  22V) to the VIN connector, and attach the input ground to the GND connector.
- 2. Attach the LDO input voltage ( $3V \le V_{IN\_LDO} \le 22V$ ) to the VIN\_LDO connector, and attach the input ground to the GND connector.
- 3. Attach a 3.3V constant voltage to the VCC connector and switch SW1 to position 1 (top side) to enable the chip.
- 4. Attach a 3.3V constant voltage to the VREF connector to set the current-sense output reference voltage.
- 5. Attach the motor's Hall signals to the Hall sensor connector.
- 6. Attach the driving control signals generated by the external controller to the CN1 connector.



## **EVALUATION BOARD SCHEMATIC**



**Figure 1: Evaluation Board Schematic** 

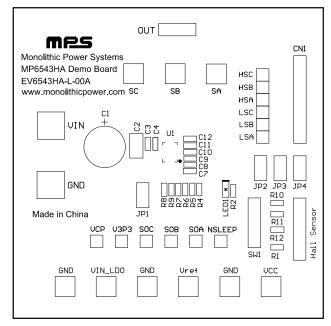


## **EV6543HA-L-00A BILL OF MATERIALS**

Qty	Ref	Value	Description	Package	Manufacturer	Part Number
5	R1, R2, R10, R11, R12	1kΩ	Film resistor, 1%	0603	Yageo	RC0603FR-071KL
6	R4, R5, R6, R7, R8, R9	4.99kΩ	Film resistor, 1%	0603	Yageo	RC0603FR-074K99L
1	C1	100µF	Electrolytic capacitor, 35V	DIP	Jianghai	CD287-35V100
1	C2	10µF	Ceramic capacitor, 35V, X7R	1210	Murata	GRM32ER7YA106KA12L
2	C3, C13	100nF	Ceramic capacitor, 50V, X7R	0603	Wurth	885012206095
1	C4	1µF	Ceramic capacitor, 16V, X7R	0603	Wurth	885012206052
1	C5	1µF	Ceramic capacitor, 25V, X5R	0603	Wurth	885012106022
1	C6	4.7µF	Ceramic capacitor, 25V, X5R	0603	Murata	GRM188R61E475KE11D
6	C7, C8, C9, C10, C11, C12	NS				
1	LED1	Red	LED	0805	Baihong	BL-HUE35A-AV-TRB
1	U1	22V, 2A	Three-phase brushless DC motor driver	QFN24 (3mmx4mm)	MPS	MP6543HGL-A
1	SW1	SPDT	Button	DIP	Wurth	450301014042
4	JP1, JP2, JP3, JP4	2-bits/ 2.54mm	Connector	DIP	Electrical market	61304011121
1	JP1	2-bits/ 2.54mm	Short jumper	DIP	Electrical market	60900213421
1	CN1	7-bits/ 2.54mm	Connector	DIP	Electrical market	61304011121
1	Hall sensor	5-bits/ 2.54mm	Connector	DIP	Electrical market	61304011121
1	PWMA, PWMB, PWMC, ENA, ENB, ENC	6-bits/ 2.54mm	Connector	DIP	Electrical market	61304011121
1	OUT	3-bits/ 2.54mm	Connector	DIP	Electrical market	61304011121
6	VCP, V3P3, SOA, SOB, SOC, NSLEEP	Yellow	Test point	DIP	Electrical market	Test point
2	VIN, VIN_GND	Φ = 2mm	Connector	DIP	Electrical market	Φ = 2mm Needle
9	VIN_LDO, VREF, VCC, GND, GND, GND, SA, SB, SC	Φ = 1mm	Connector	DIP	Electrical market	Φ = 1mm Needle



## **PCB LAYOUT**



Q

Figure 2: Top Silk Layer



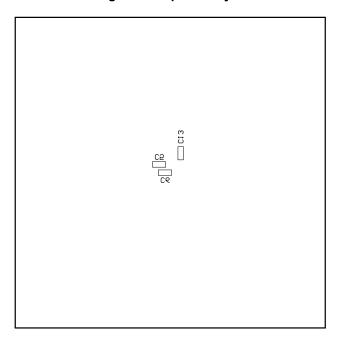


Figure 4: Bottom Silk Layer

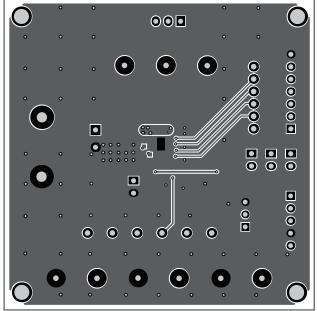


Figure 5: Bottom Layer

Notice: The information in this document is subject to change without notice. Please contact MPS for current specifications. Users should warrant and guarantee that third-party Intellectual Property rights are not infringed upon when integrating MPS products into any application. MPS will not assume any legal responsibility for any said applications.