EV6543HB-L-00A

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

DESCRIPTION

The EV6543HB-L-00A is an evaluation board for the MP6543HGL-B, a three-phase brushless DC motor driver.

The EV6543HB-L-00A operates from a supply voltage up to 22V. 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 the external controller, such as an MCU or FPGA.

ELECTRICAL SPECIFICATIONS

Parameter	Symbol	Value	Units
Input voltage	V_{IN}	3 to 22	V
LDO input voltage	V_{IN_LDO}	3 to 22	V
VREF voltage	V_{REF}	3.3	V
VCC voltage	V_{CC}	3.3	V

FEATURES

- Wide 3V to 22V Input Voltage Range
- Built-In 3.3V, 100mA LDO Regulator
- Integrated Bidirectional Current-Sense Amplifiers
- Support 100% Duty Cycle Operation
- Hall 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

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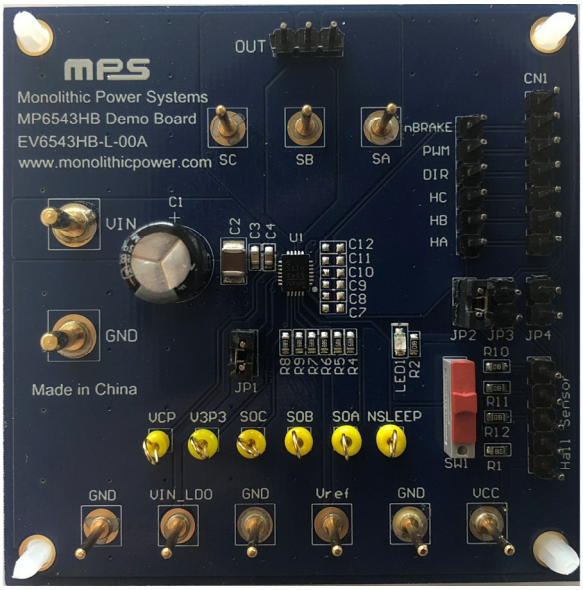
EV6543HB-L-00A EVALUATION BOARD



(LxW) 6.35cmx6.35cm

Board Number	MPS IC Number
EV6543HB-L-00A	MP6543HGL-B

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QUICK START GUIDE

1. Attach the input voltage (3V ≤ V_{IN} ≤ 22V) to the VIN connector, and attach the input ground to the GND connector.
2. Attach the LDO input voltage (3V ≤ V_{IN_LDO} ≤ 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, then 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. Table 1 shows the commutation table.

Table 1: Commutation Table of the MP6543HGL-B (nBRAKE = 1)

Logic Inputs				Motor Terminals		
HA	HB	HC	DIR	SA	SB	SC
1	0	1	1	PWM	Z	L
1	0	0	1	Z	PWM	L
1	1	0	1	L	PWM	Z
0	1	0	1	L	Z	PWM
0	1	1	1	Z	L	PWM
0	0	1	1	PWM	L	Z
1	0	1	0	L	Z	PWM
0	0	1	0	L	PWM	Z
0	1	1	0	Z	PWM	L
0	1	0	0	PWM	Z	L
1	1	0	0	PWM	L	Z
1	0	0	0	Z	L	PWM
0	0	0	X	Z	Z	Z
1	1	1	X	Z	Z	Z

6. Attach the driving control signals generated by the external controller to the CN1 connector.

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EVALUATION BOARD SCHEMATIC

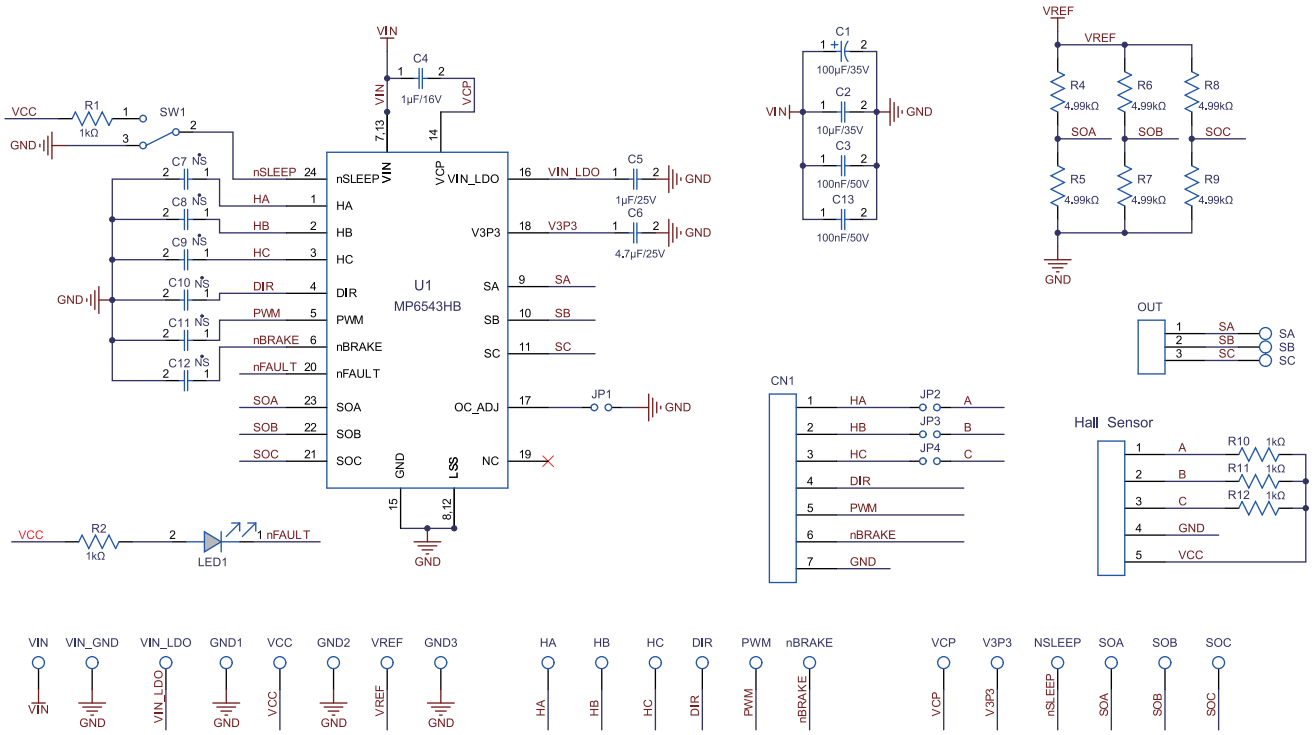

Figure 1: Evaluation Board Schematic

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EV6543HB-L-00A BILL OF MATERIALS

Qty	Ref	Value	Description	Package	Manufacturer	Manufacturer P/N
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	QFN-24 (3mmx4mm)	MPS	MP6543HGL-B
1	SW1	SPDT	Button	DIP	Wurth	450301014042
4	JP1, JP2, JP3, JP4	2-bits/ 2.54mm	Connector	DIP	Electrical market	61304011121
4	JP1, JP2, JP3, JP4	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

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PCB LAYOUT

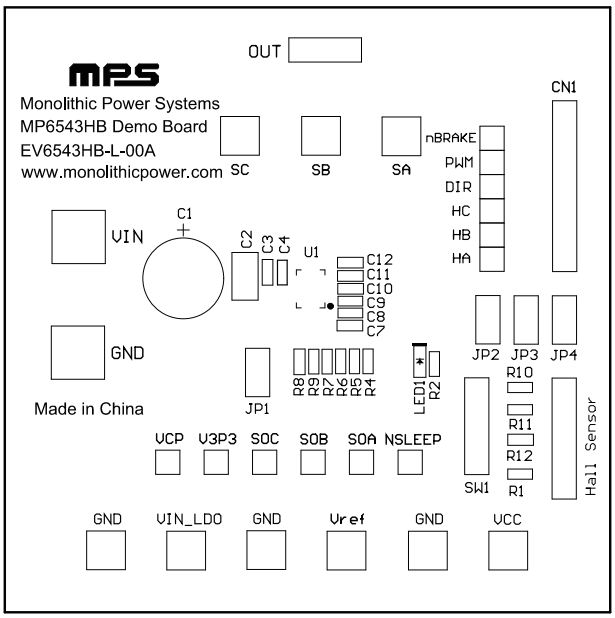

Figure 2: Top Silk Layer

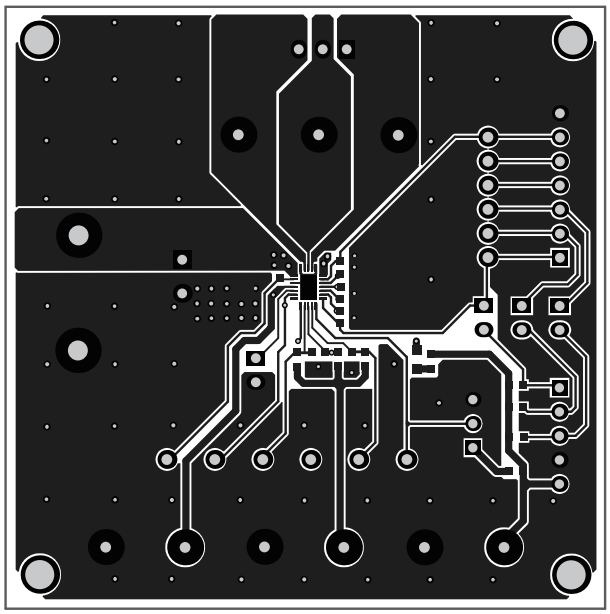

Figure 3: Top Layer

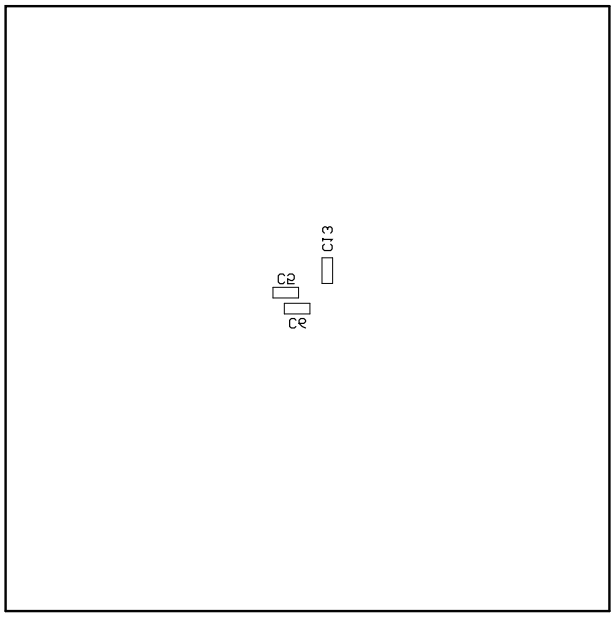

Figure 4: Bottom Silk Layer

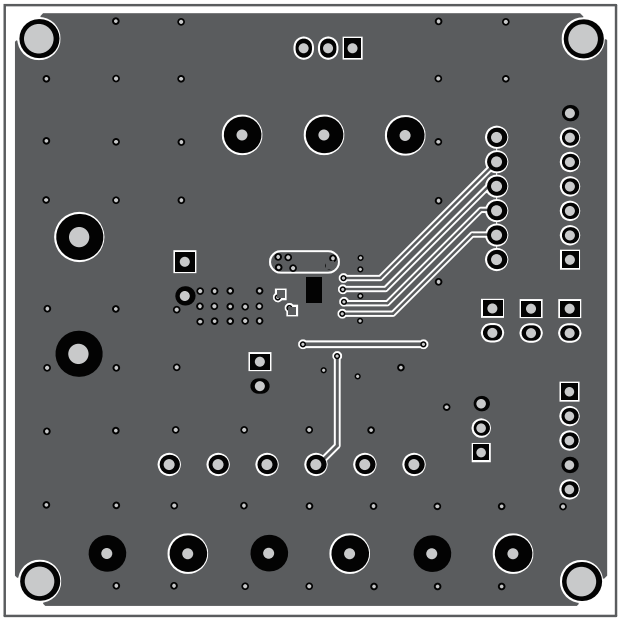

Figure 5: Bottom Layer

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