EV6543C-L-00A

3V to 22V, Three-Phase Brushless DC Motor Driver with 100mA LDO Regulator Evaluation Board

DESCRIPTION

The EV6543C-L-00A is an evaluation board for the MP6543C, a three-phase brushless DC motor driver.

The EV6543C-L-00A operates from a maximum 22V supply voltage. The device integrates three half-bridges consisting of six N-channel power MOSFETs. Each half-bridge has an independent ground pin to provide current measurement through an external shunt resistor. 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.

The MP6543C is available in a QFN-24 (3mmx4mm) package.

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
- Supports 100% Duty Cycle Operation
- EN/PWM Logic Input
- Independent Ground for Each Half-Bridge
- Over-Current Protection (OCP), Over-Temperature Protection (OTP)
- Fault Indication Output
- Available in a QFN-24 (3mmx4mm) Package

APPLICATIONS

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

EV6543C-L-00A EVALUATION BOARD

(LxW) 6.35cmx6.35cm

Board Number	MPS IC Number
EV6543C-L-00A	MP6543CGL

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 the top side (position 1) 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

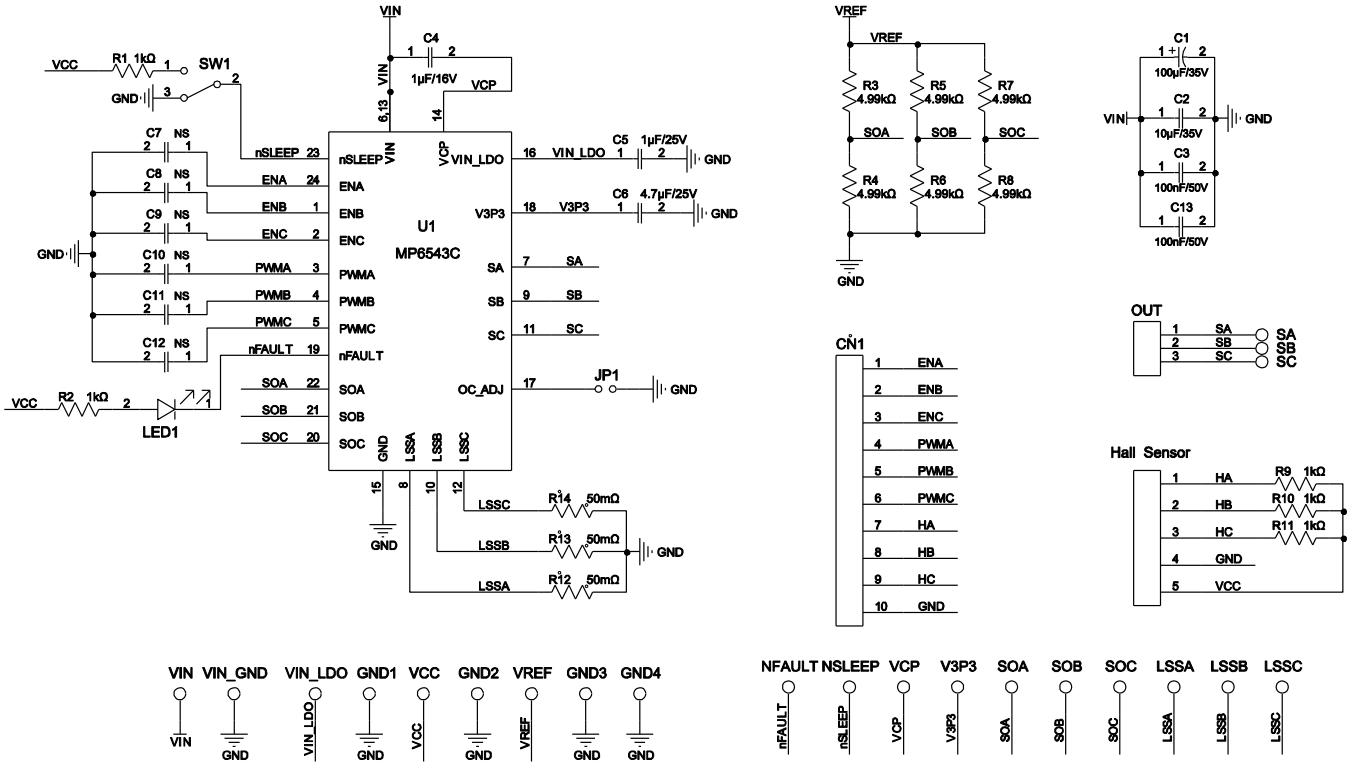

Figure 1: Evaluation Board Schematic

EV6543C-L-00A BILL OF MATERIALS

Qty	Ref	Value	Description	Package	Manufacturer	Manufacturer P/N
5	R1, R2, R9, R10, R11	1kΩ	Film resistor, 1%	0603	Yageo	RC0603FR-071KL
6	R3, R4, R5, R6, R7, R8	4.99kΩ	Film resistor, 1%	0603	Yageo	RC0603FR-074K99L
3	R12, R13, R14	50mΩ	Film resistor, 1%	2512	Yageo	RL2512FK-070R05L
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	MP6543C	22V, 1.2A, 3-phase brushless DC motor driver	QFN24 (3mmx4mm)	MPS	MP6543CGL
1	SW1	SPDT	Button	DIP	Wurth	450301014042
1	JP1	2-bits/ 2.54mm	Connector	DIP	Any	
1	JP1	2-bits/ 2.54mm	Short jumper	DIP	Any	
1	CN1	10-bits/ 2.54mm	Connector	DIP	Any	
1	Hall sensor	5-bits/ 2.54mm	Connector	DIP	Any	
1	OUT	3-bits/ 2.54mm	Connector	DIP	Any	
10	VCP, V3P3, SOA, SOB, SOC, NSLEEP, NFAULT, LSSA, LSSB, LSSC	Yellow	Test point	DIP	Any	
2	VIN, VIN_GND	Φ = 2mm	Connector	DIP	Any	
10	VIN_LDO, VREF, VCC, GND, GND, GND, GND, SA, SB, SC	Φ = 1mm	Connector	DIP	Any	

PCB LAYOUT

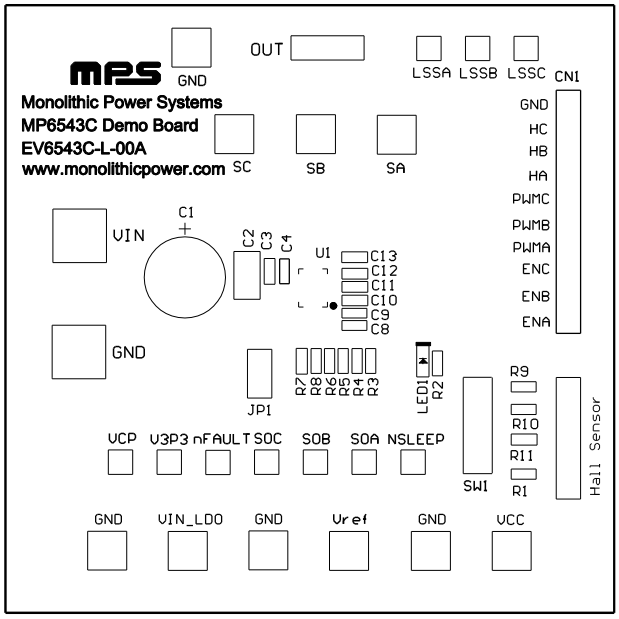

Figure 2: Top Silk Layer

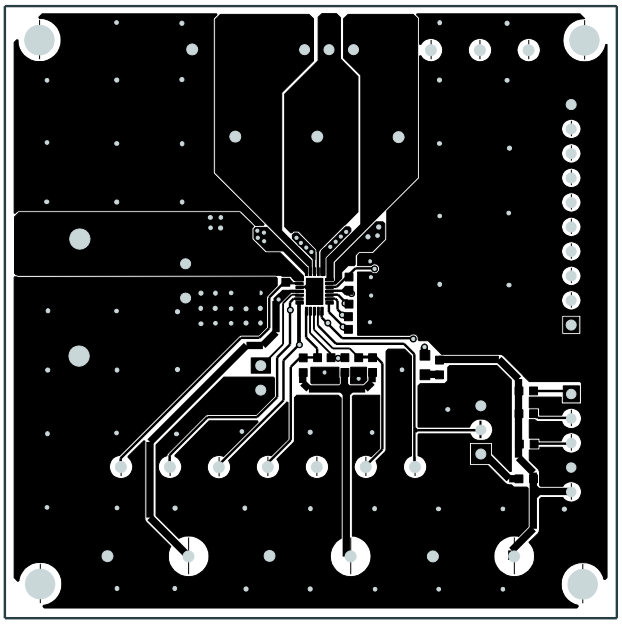

Figure 3: Top Layer

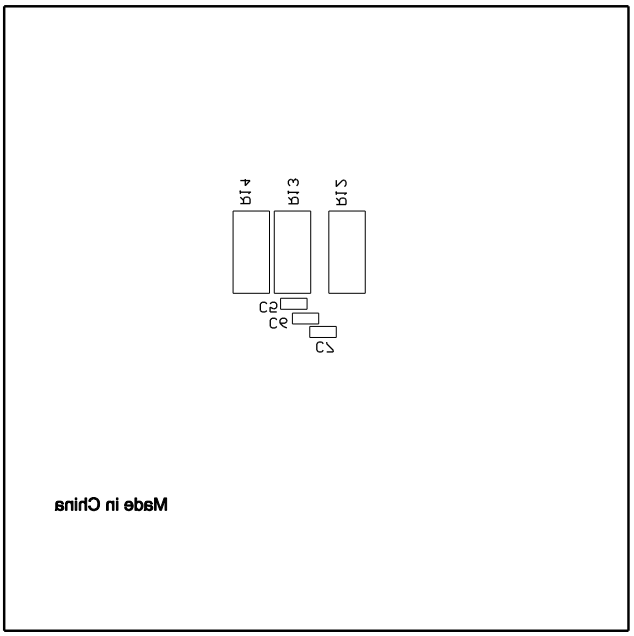

Figure 4: Bottom Silk Layer

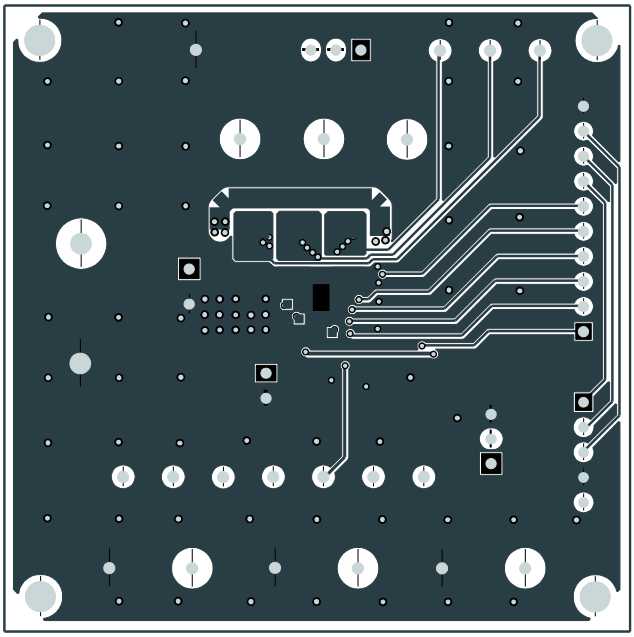

Figure 5: Bottom Layer

REVISION HISTORY

Revision #	Revision Date	Description	Pages Updated
1.0	3/19/2021	Initial Release	-

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Monolithic Power Systems (MPS):

EV6543C-L-00A